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ABSTRACT

The National Association of Educational Broadcasters attempted to determine how educational television and related technologies could strengthen the educational system of Tunisia. An overview of the Tunisian society is presented, followed by a brief history of the development of its educational system. The tremendous educational needs of the nation are delineated. A discussion of the ways in which television technology could be used to expand the capacity of the educational system concludes with formal recommendations for the future. Technical problems and costs are considered. The appendixes provide detailed information on the existing educational and television facilities of Tunisia. (EMH)

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EDUCATIONAL TELEVISION

AND

EDUCATIONAL DEVELOPMENT

IN

TUNISIA

prepared for

AGENCY FOR INTERNATIONAL DEVELOPMENT

by

NATIONAL ASSOCIATION OF EDUCATIONAL BROADCASTERS

Washington, D. C.

MAY 1968

U S DEPARTMENT OF HEALTH, EDUCATION & WELFARE
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SUMMARY

A team of consultants from the National Association of Educational Broadcasters was invited to examine educational needs and current educational efforts in Tunisia to determine whether and how modern communications technology, particularly television, might be used to accelerate achievement and provide increased levels of educational productivity.

For the most part, the formal education program at all levels is administered through the Secretariat of National Education, but the team learned that many other important educational efforts in Tunisia are conducted by several different secretariats. The educational programs at present share common deficiencies and weaknesses and they confront similar problems which inhibit substantial increases in their effectiveness.

The commitment to significant improvements in education is apparent in all sectors of the government, but there are limited resources available and there is no systematic means by which these limited resources can be amplified to cover large areas of the population. In addition, the present design of instructional and educational materials does not provide a satisfactory basis for achieving needed functional learning in basic skills such as reading, writing, and vocational abilities.

The report indicates how communication technology makes it possible to multiply many times the availability of limited teaching skills and resources. It shows how an educational television system can reduce the need for extensive duplication of instructional resources and materials that are difficult to develop

and how it can establish throughout a large area uniform minimum levels of educational standards. The study illustrates how an educational television system might be organized and used to achieve these advantages.

Functions for an educational planning unit, ranges of costs, at various levels of operation and detailed engineering problems that must be given consideration are identified.

The preliminary nature of this study precluded extensive discussion with Tunisian officials about basic educational problems. They were, in general, uncertain about the reasons for the study and not in a position to provide the kind of fiscal and organizational detail that is needed to articulate operational plans with any degree of specificity. In addition, the complicated nature of educational efforts in Tunisia has limited our ability to specify organizational details about a system design. The suggestions, therefore, are not intended to be a blueprint, but rather as a guide to the development of one.

The recommendations indicate that a high level United States Task Force be authorized to present to Tunisian officials the potential educational advances that can be facilitated by means of the technological and educational systems that have been described in this report, and that the cooperation of the Tunisian government be secured to carry planning forward.

WHAT WAS STUDIED AND WHY?

The report of the White House Task Force on Educational Television recommended that "positive steps should be taken to assist developing countries in determining how educational television and related teaching technologies can strengthen these school systems."

Creation of a series of major proposals in promising countries around the world during the next few years is viewed by the Task Force as essential to the emergence of this potentially revolutionary educational approach.

As a means of advancing toward this objective, AID entered into a contract with NAEB to conduct studies in several countries to analyze the feasibility of using large-scale television systems to help achieve educational and development goals. The present study in Tunisia was undertaken as a part of this contract.

The general purpose of this study was to explore the possible application of television - and to some extent radio - as major instruments to facilitate national development in Tunisia. In accord with the principal concern of the White House Task Force on Educational Television in Developing Countries, the study was to examine the potential for Tunisia's use of television in schools as a key element in a major program of educational expansion, upgrading and reform. Also to be considered were the possible uses of television for teacher training and as a catalyst to social development through literacy campaigns, civics education, family planning techniques, health programs, and through agricultural extension. The AID mandate, while stressing in-school applications of television, embraced community education activities inasmuch as there exists

the possibility of using a single technical system for several different applications.

In carrying out its study the NAEB adopted the following guidelines:

1. Education is basic to the social, political, and economic development of a nation. Hence, any means - such as television - which has the potential to increase the productivity of education in a society must be studied in the context of the total national environment and in relation to overall national planning.

2. Although television is often thought of primarily in connection with education, it has great utility as a social instrument for furthering progress in health, welfare, social behavior, and as a means for effecting national cohesion.

3. Television technology is not an end in itself but a means of doing better what is already underway or a means of undertaking what would otherwise be impossible. The NAEB approach, therefore, was problem-oriented: analyzing various conditions and situations in which an ETV/systems approach could be projected into a role that would help cope with specific conditions or problems.

4. Television is expensive and is a luxury for educational development unless it is used comprehensively to achieve desired goals at less cost than is possible by conventional means.

The NAEB field study team was composed of individuals selected because of their professional competence in a variety of relevant fields and because of their extensive experience as members of similar foreign study teams. Its members were:

George Hall: Instructional technologist with experience in American Samoa, Trinidad-Tobago, and Jamaica.

William Harley: President of NAEB and communications specialist with experience in the Sudan, American Samoa, Uganda, Kenya, and Trinidad-Tobago.

W. B. Johnson: AID specialist in population control and agricultural extension with special experience in India.

William Kessler: Engineering consultant for NAEB with overseas experience in American Samoa, U. S. Trust Territory, and El Salvador.

William Odell: Professor of Education, Stanford University and educational management consultant, with experience in American Samoa, U. S. Trust Territory, Iran, and the Phillippines.

The approach of the study and the organization of the report follow similar patterns. The NAEB study team embarked upon a fact-finding visit in late January. [1] A major proportion of the time was spent learning about the current efforts in education, social development, vocational and professional training. Such study involved not only a catalog of current programs, but an analysis of their objectives, and a review of their perceived and actual effectiveness. As will be seen in subsequent sections, the organization and execution of education in Tunisia is highly diversified. Perhaps as a consequence, accurate, current, and comprehensive information about the total effort was not easily or readily available from AID, or any central source within the government of Tunisia.

In each educational sector, efforts were made to elicit from AID personnel and from Tunisian officials their analysis of the problems being faced in initiating

[1] See Appendix F for Intinerary and Interviews.

and maintaining effective programs in the major areas of national development. Whatever technical system may ultimately be recommended will be functionally important to the extent that it is able to assist in achieving higher levels of effectiveness for those programs within the limits of available resources and economic feasibility.

BACKGROUND DATA

National Goals

Much has been written concerning the great advances and changes that have occurred in Tunisia since independence. Most of these are scarcely distinguishable from the ideas and purposes of the nation's leader and president, Habib Bourguiba. It was he who led the revolution against colonial rule, largely shaped the victory, and as president and national hero set the path along which Tunisia since has traveled.

Tunisia is regarded by many as the most successful of the African developing nations. In ten years of independence it has made broad advances along many fronts. Its government is to date stable and enjoys substantial popular support.

At the risk of oversimplification, the goals for national development may be extenied from the so-called Ten-Year Plan, 1962-71. According to Ghazi Duwaji[2/] there were both qualitative and quantitative objectives set forth in that program. The former included such matters as: (a) advancement of the individual, (b) the decolonization of the country, and (c) the reform of existing structures.

Advancement of the individual included both moral and material considerations. Thus Bourguiba frequently addresses the nation giving advice about discarding the veil, responsibilities of citizenship, etc.

Decolonization of the country meant chiefly the removal of French economic domination, but included as well the bringing of other foreign strongholds under

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2/ Economic Development of Tunisia, Ghazi Duwaji, Frederick A. Praeger, Publishers: New York & London, 1967, page 177.

Tunisian control. In spite of this determination for economic emancipation, respect and even reverence for French patterns of culture persist and control many facets of Tunisian life, including particularly the educational program and its operation.

The reform of existing structures included mental modifications as well as social and economic ones. The goal was to develop a modern healthy outlook by all its people while also changing traditional and basic concepts and patterns of life and government.

The qualitative goal was set in the proposal to increase the gross domestic product at the annual rate of 6 per cent. The 1962 figure was set at $688.8 millions. However between 1950 and 1963 the Tunisian economy grew at only an annual average of 2.4 per cent, and ranged from 12.2 per cent to -7.2 per cent during the period 1950-1961. Some regard this goal to be unrealistic, but the record to date is surprisingly good.

The determination to "modernize" Tunisia has dominated many of President Bourguiba's actions. Achievements include women suffrage, challenges to Moslem religious practices, seizure of French lands, socialization of selected elements of the economy, extensive public works programs, development of a uniquely balanced constitutional single party system of government, and an expansion of public education programs.

Population

Comparative population data are not wholly dependable. The total population in 1967 approximated 4.5 million. A high proportion, approaching 30 per

cent, is urban, i.e., lives in cities of 10,000 or larger. Sixty percent of the population lives in 20 per cent of the country's total area in the northern and eastern regions. About two and a half million are considered to be rural, with the proportion continuing to decline. Also one million live in the four large cities of Tunis, Sfax, Bizerte and Sousse.

Males outnumber females 104 to 100. The annual population natural increase approximates 2.5 per cent. Forty three per cent of the population is under 15 years and slightly more than 50 per cent under 20 years of age. Life expectancy is estimated to be less than 45 years, with some increase to be expected due to a continuous lowering of the death rate. Perhaps about 13 per cent of the total population is over 50 years of age.

Estimates of future birth rates are difficult to establish because of the developing family planning program. Migration in or out of the country appears presently to be only a minor factor affecting Tunisia's population.

Employment

Estimates of the total labor force approximate 1,500,000 or 30 per cent of the total population. Of this number about 20 per cent are women and 3 per cent are foreigners. The military and public works programs account for another 1 per cent of the total population. Unemployment figures are difficult to determine but they range from 12 per cent to twice that, with especially heavy unemployment in the agricultural sector. Moreover, most agricultural and construction workers are employed on the average only 130 to 150 days per year. Underemployment is considered to be a serious problem. With the large

numbers of youth fast coming to employment age, the prospect ahead for employment difficulties is further enlarged.

The 1964 distribution of workers is as follows:

Agriculture	55-58%
Manufacturing	14%
Transportation, Communication and Services	8%
Commerce	7%
Government	7%
Construction and Public Works	7%
Mining	2%

Education

Education since independence has been accepted as a national imperative, and great quantitative growth has occurred.[3] The qualitative changes are more subtle and harder to evaluate.

To begin with, it is conceded that social and political education is the role of all governmental divisions and agencies. President Bourguiba and Ben Salah, Secretary of State for the Plan and National Economy, emphasize continually the necessity for all Tunisians to understand the national goals, to believe that each citizen has an essential part to play in the national destiny, and that the national goals can be realized only by continuing universal self-sacrifice. Thus each secretariat has a direct obligation to advance knowledge about and specific objectives of its program. This they all do.

The role of the Secretariat of State for National Education (SONE) traditionally has been considered to be that of managing the formal school system. Its task recently has

[3] In 1957, there were 320, 362 pupils; 1966 enrollment figures indicate a student population of approximately 943, 000.

been overwhelming: to provide universal elementary education for girls and boys for six years, and to multiply severalfold the secondary and higher education system (including greatly expanded teacher education). Its task has recently been increased by transferring formal agricultural education to this secretariat. This may foreshadow a broadening concept of this secretariat's role.

Teacher development and physical plant expansion have been two additional concerns during this educational expansion period. Numerous schools have been built, including several new middle and six-year secondary schools substantially financed by American and other foreign funds. Many new teachers have had to be recruited hurriedly and with short-cut programs. Class sizes are over-large; hence, the end of needed additional classrooms and teachers is not in sight.

The adult and literacy program is another major focus for recent expansion, with television as an important aid. This is the responsibility of another secretariat, that of Cultural Affairs and Information. Here the organizational structure used instead of the schools is the vast network of political party organization that reaches to the remotest village. Thus parallel educational programs use parallel organizational patterns to achieve their individual ends.

As other public information programs are considered essential, still other secretariats undertake large-scale educational programs. National Defense has a substantial literacy program; Youth, Sports and Social Affairs is developing a massive family planning educational program; Public health has its program; agriculture and vocational education programs develop in plan and National Economy.

Each secretariat develops its own technical resources for achieving its educational goals. However, an independent agency for radio and television - R-TT - is a special technical resource for all to use. The Bureau of Audio-Visual Education which once served two secretariats, Education and Cultural Affairs, now appears to be increasingly involved with the new program of the Division of Planning and Research in the Secretariat of National Education. It is producing experimental materials, especially those related to the improved teaching of French at the third and fourth grade levels.

The University of Tunis has been involved in all of these expansion programs. The new Division of Planning and Research in SONE has ties with the University Center for Educational Study and Training.

A new factor with far-reaching implications for education in Tunisia is the recently issued report of the National Commission for Education. This Commission, headed by Ben Salah, examined the ten-year program of elementary education development and expansion. Its recommendations are encouraging study of revealed problems and extensive reconsideration of educational practices and goals. Out of this Commission came the establishment of the new Division of Planning and Research of SONE headed by Chedli Fitouri.

This Division has underway studies relating to the problems raised by the Commission report, and others. The work is being carried on by both practical field educators - inspectors, teachers, etc. - and theoreticians and special resources people. Studies we know about include the problems of school dropouts and failures, rewriting of text materials, experimental use of television

for teaching in the elementary schools, in-service teacher training programs, etc. Fitouri says that problems for study have come from "all sources," the field, secretariats and the University.

Basic problems referred to in the Commission for Education Report include:

1. Further extension of the use of Arabic as the language of instruction.
2. Better mastery of Arabic by teachers - in-training to enable them to teach in Arabic.
3. Drop-outs and failures in the present elementary school program.
4. In-service training of present sub-standard teachers, including television for vocational teachers.
5. Increasing the number and quality of school inspectors.
6. Reduction in class sizes.
7. Production of better textbooks through finding authors, better publishing and distribution arrangements, Tunisification and Arabicification of content, etc.
8. Modern communications systems and media for all schools.
9. More extensive co-education.
10. The continued use of French as the language of instruction starting with the third grade, with Arabic taught as a language presumably due to present limitations upon the ability to do otherwise; i. e., teacher-shortage, present text materials, 3000 French teachers of which a large proportion are conscripts serving their military service by this means, etc.

Detailed descriptions of the educational programs are in the following sections.

Radiodiffusion-Television Tunisienne

Radiodiffusion-Television Tunisienne (R-TT) was officially inaugurated by President Bourguiba on May 31, 1966 in a televised speech in which he described television as an "efficacious instrument of human betterment." Providing the programs were "attractive and educational," he said, television will be a link which "will unite us all, a link capable of advancing the Tunisian people's evolution and of strengthening its qualities of perserverance, sincerity and courage."

R-TT is operated by the state and is clearly regarded as an instrument of national purpose and a major means of advancing the policies of the government. In particular, President Bourguiba perceives of R-TT as a means for affording him direct contact with the people; hence, he is eager to reduce the price of sets so that eventually every family can afford a receiver and he can talk, "face to face with all of you in your homes."

Nominally R-TT is within the Secretariat for Culture and Information; in practice the Director-General of R-TT reports directly to the President.

At present there are two transmitters: the Zaghouan station, the Bou Kornine station.. These transmitters cover an area northward to Bizerte and southward to Kairouan; about 35 per cent of the population resides in this area.[4/] According to plan, transmitting stations will be added to extend coverage to include about 75 per cent of the total population by the end of 1969.[5/]

There are an estimated 35,000 television sets in operation. They are of

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[4/] Technical details are in Appendix A.

[5/] Technical details are in Appendix B.

three makes: Franco-Tunisian, Italian, and German. They are all table models and have 59 cm screens. All vendors provide repair services and the concessionaires in Tunis afford after-sale repair and maintenance services.

The Office of Social Education has purchased 100 receivers which have been located in community centers, party headquarters, literacy centers, restaurants, and other places where people gather for community activities.

The cost of receivers has been coming down rather rapidly and is now about US$180-225.[6/]

The Program

At present, R-TT is broadcasting in the evening hours only from 6:30 - 9:30 p.m. seven days per week. Three-fourths of the programs are in Arabic, the rest in French, except for one English language program. Eighty per cent of the Arabic programs are produced in Tunisia - as is the case with the radio service - and are designed to be educational in the sense of advancing the social, intellectual, and spiritual well-being of the populace. The programs can be roughly divided into news and discussion programs, news reports, news reels, "inquiries" and debates, athletic events and recreational and cultural programs; music, theatrics, variety shows, recreational programs for youth, and special cultural programs on folk songs, literature, poetry, etc. The only organized education series is one in basic literacy training.

Financing

The capital investment in the present TV system approximates $2,000,000

6/ Technical details are in Appendix C.

and operating costs are about $1,500,000 annually. Principal source of income is from taxes imposed upon radio and TV sets; collection of this tax is only about 40-80 per cent effective. Other income derives from "various penalties" and the remainder is made up from the State Budget.

Attitude of R-TT Administration

An interview with the head of the television service and the Deputy Director-General identified the following attitudes:

1. Tunisian TV is still in its infancy and its first concern must be the extension of coverage to all the people of the country.

2. The primary purpose of television in such an underdeveloped nation is education but not in an academic sense. It is to lead the mass of the population to improve their lives economically, socially, and culturally. This involves imparting not only techniques but "attitudes of progress." Television must serve as a means by which the elite of the country can have direct contact and influence upon the mass of the population and thus lead them to a more fruitful life.

3. It is better to move slowly and be sure of one's effectiveness than to move too quickly and fumble. With limited resources they cannot afford to make mistakes.

4. The greatest inhibitions to expansion of the TV operation are lack of adequate facilities and trained personnel. It was felt that the 24 hour per week schedule was the maximum operation under present conditions.

EDUCATION - THE CURRENT PROGRAMS AND NEEDS

Educational Programs in Tunisia

The word education has a very broad meaning in Tunisia, an understanding of which is vital to an appreciation of the large number of programs which are so labeled by the Government of Tunisia (GOT) and AID. It covers not only formal, academic and vocational schooling, teacher training and university study but also a wide range of extra-scholastic efforts in adult education, vocational training, home economics, literacy, cultural appreciation and socialization. While GOT obviously must place different priorities on these varied programs, they are all considered important and necessary to the national development. Indeed, the priorities among them are difficult to weigh, except of course that formal education is clearly the most heavily supported in terms of budget, staff, facilities, enrollments and hierarchical position within GOT itself.

All formal, academic programs in Tunisia are under the Secretariat of National Education (SONE). The many other, extra-scholastic programs are conducted by various bureaus within the Secretariats for Plan and National Economy (including Agriculture); Cultural Affairs and Information; Youth, Sports and Social Affairs; Public Health; National Defense and perhaps others as well. The Secretariat for Public Works and Housing, while conducting no educational programs of its own, also figures in because of its responsibility for coordinating the school/university construction.

There are two other "official" elements essential to an understanding of Tunisian educational patterns: President Bourguiba and his Socialist

Neo-Destourian Party. The influence of these powerful elements throughout the wide range of educational efforts and establishments is profound. It is undoubtedly correct to say that the general directions of the whole educational "sector" have been derived from the socio-economic and political doctrines generated by Bourguibaism, although the continuing influences of the "French system" are by no means to be overlooked. Indeed, Bourguibaism itself has apparently built much of its own educational doctrine on the implicit assumption that the main structure of the "French system" is a generally reliable model for Tunisian development, in spite of its "elitist" implications.

The focus of Bourguibaism in the broad educational realm has been on aggressive programs designed to weld Tunisia into conscious, modern, westward-looking nationhood and to give the Tunisian man-on-the-street fundamental coping skills which will let him live and work effectively in the new, more complex socio-economic environment thus resulting. To these ends, various organs of government have been instructed to devise and operate educational programs and campaigns which are roughly divisible into the following descriptive categories:

A) Formal Education (Primary, Secondary and Higher),

B) Vocational Training for youth and adults,

C) Homemaking Training for girls and women,

D) Community Kindergarten Programs,

E) Agricultural Training for youth and men,

F) Literacy and Cultural Training for youth and adults,

G) Health and Family Planning Programs for adults.

Formal Education: Primary

The Primary School program consists of six grades, with entrance at age 6. All children in the age range are "eligible" but attendance is not compulsory. In fact, because of shortages of teachers and places, a considerable number of children could not attend, even if all wished to. The pressure on the schools is relieved to some extent by an unwillingness in some "traditional" families to allow girls to attend. (This practice is apparently on the decline, however. Many such girls are now enrolled in the Literacy programs of the Secretariat of Cultural Affairs and Information.)

In the current year, there are 827,000 students enrolled in the primary grades, an increase of 49,000 over last year. It is statistically predictable that about 18 per cent of the children who enter the first grade will drop by the fourth and that around 46 per cent will not finish the sixth. The repeater ratio is very high: 37 repeaters for every 100 non-repeaters. Forty three per cent repeat the sixth grade along. On the average, the six years of study are completed in eight years. Forty per cent of those students who ultimately complete the primary program become eligible through examination to enter the secondary programs described below.

The primary program currently involves some 2,100 different schools (with some 10,000 to 12,000 classrooms) and some 14,000 teachers, the great preponderance of whom are native Tunisians. Some U.S. observers on the scene estimated that about 30 per cent of those teachers are probably "incompetent." There are about 1,000 native French teachers scattered throughout the primary system, with the great majority of them found in the upper grades where French

is the language of instruction. Primary teachers are of two ranks: moniteurs who have a less-than-full-secondary education and instituteurs who have completed the normal program offered by secondary schools. The moniteurs, of whom there are a great many, are regarded as "inadequate," although not necessarily incompetent. Various schemes are now being considered for up-grading the pedagogical and content skills of these teachers.

Arabic is the medium of instruction for the first two years, with French phased in at the third grade. By the end of the primary program Arabic is used only in the study of itself, with all other subjects treated in French. The oral language problem is complicated by several factors. The schools use "classical Arabic," which is apparently rather different from the "family Arabic" the entering child knows. Many of the Tunisian primary teachers speak less-than-adequate French themselves, thus inhibiting academic procedures built around that language. Apparently a great many Tunisian parents who have come through the primary system have only a marginal facility with the second tongue, thus they do not use it en famille to reinforce its habitual acquisition by their children in turn.

The nationally-set curriculum of the primary program includes Arabic and French (in both oral and written forms), arithmetic (largely computational), history, civics, geography and elementary science. English is also taught in a small number of schools by members of a Peace Corps unit in Tunisia. There is apparently also some attention paid to such matters of personal hygiene, sports and religion.

The methods of instruction would appear to center around rote-learning techniques. Text and workbooks, maps and other "standard" instructional materials are "supposed to be" widely available. The books are often written, designed and printed in Tunisia, some in Arabic and some in French. There is a national audio-visual center at SONE, Tunis, but the distribution pattern is not likely to be elaborate because of limited supplies and a lack of any appropriate teacher-training in the use of such elements.

Both the primary and secondary schools are centrally administered by SONE, Tunis. There are, however, 13 governorates in the country which have regional "branch" offices of SONE. Various officials and inspectors are charged with advising, monitoring and evaluating school programs. Many of these persons have regular travel schedules for on-site visits with school principals and teachers. The role of headmaster is apparently not sharply unlike that of an American principal, this being inferred from the fact that there is now a plan "to relieve headmasters of some of their administrative duties" so that they may be of more pedagogical help to the teachers.

The recently established Planning and Research Division has responsibility for devising new curricula and methodologies. Under the professional leadership of M. Chedli Fitouri, the Division has already begun to investigate rational ways by which technology could be introduced to improve the learning efficiency of educational programs at all levels, but especially the elementary. There are some plans for using a single-school CCTV system to help "validate" televised elements in various academic courses

(especially in French language instruction) which might ultimately be projected to all national schools through R-TT facilities. While this could lead to the development of threshold skills in producing TV material for school use, the validity and reliability of this "pre-testing" technique must be questioned, because the operating controls and values obtaining within a single school building cannot reasonably be generalized to apply equally well in the many hundreds of other schools widely dispersed across Tunisia.

The new section also has underway various design schemes for elementary textbooks. Team members were shown examples of the materials resulting from this effort. The publications were attractively put together, but their articulation in relevant courses of study was not much evident.

We believe it is too early to estimate the kind of authority the new section may come to wield within SONE; although the team members were very favorably impressed by the dynamism of M. Fitouri's professional direction.

Tunisian school buildings show great variation in age, style, quality of construction, classroom complement and equippage. A general characteristic is that they consist of several-to-many self-contained classrooms, each equipped with a teacher's desk, blackboard and student desks (usually for two or three pupils on a common bench). Room capacity varies, of course. The national teacher:pupil ratio is 1:45, with ratios as high as 1:60 encountered in official studies of the question.

It is alleged that virtually all schools have (or could easily have) electricity. This certainly seems likely in the more heavily populated areas along the northeast

coast. Some of the older schools, at least, are not heated during the short, mild winter. The national pattern is not clear. Nor are the practices relating to installing electric outlets and lighting fixtures.

The primary school year is 30 weeks long, over the winter. The first two grades require 15 hours per week, the others 25 hours. Next year the school week is slated to increase to 30 hours at the sixth grade level, extending down into the earlier grades as teachers and facilities permit. The 30 hour figure was universal until 1958 when the legal principle of "universal eligibility" flooded the schools with more children than could be handled. The proposed return to 30 hours will mean some 700 extra classes and 460 extra teachers needed for the first phase alone.

The tradition of gender-segregation still persists throughout most of the country. A gradual elimination of this practice is forecast, with some possible improvement in the assignment of teachers.

Formal Education: Secondary

The Secondary School program is complex. The full program covers grades 7 to 13, ages 12 to 18. Eligibility to either of the two basic "tracks" is gained only by satisfactorily passing a "common examination" offered at the end of the sixth grade. The examination is in French, except for sections dealing with Arabic literature and culture. About 40 per cent of the students who complete the sixth grade qualify for secondary studies.

The two basic "tracks" are the Vocational and the Lycée. The Vocational is a three year, terminal program with commercial (business), technical

(trades) or agricultural "majors." Students who complete these courses of study are considered skilled workers and may go directly into the labor force. The Lycée is divided into two cycles. The first, or general cycle, consists of three years of formal, academic work in "letters, science and mathematics." Accomplished students who pass a special examination in French (with Arabic sections) are admitted into the second, or advanced, cycle, now to last four years. Students who stop at the end of the first cycle enter the labor force as clerks or sub-professionals.

The elitist, second cycle of the Lycée is quite varied in its offerings and emphases. Students can major in business and commerce, technical mathematics, industrial arts, agricultural science, teacher training or in a strict college preparatory sequence. Almost all of these programs can become springboards to further study at the university level or to sub-professional employment.

The teacher training course at the secondary level leads to instituteur status in the primary system. In addition to teacher training components within second cycle Lycée programs across the country, there are also three schools for training instituteurs. Apparently the curricula among these institutions are virtually the same. Persons who wish to become teachers at the secondary levels must pursue college-level studies at one of the two appropriate Normal Schools or at the University of Tunis. To teach at a vocational high school or in the first cycle of the Lycée program, requires two years of higher education. To teach in the second cycle of the Lycée program, requires four. Pedagogy is only a fairly minor component of the course study in any of the three teacher-training curricula. SONE is now developing various plans for changing this practice.

In the current year, there are about 116,000 students in the various secondary schools. About one-third of these are in the Vocational track. 33,000 are in their first year of secondary work. Roughly 40 per cent of those who enter secondary schools are able to graduate.

The secondary system depends on 4,600 teachers, of whom 2,700 are native Tunisians. Most of the remainder are native French, some of whom are nuns and some of whom are young men who prefer teaching in Tunisia to conscription in the French military. French teachers are paid about double the rate of Tunisian teachers, even when their skills may be equivalent. While the ratio of French teachers is expected to be somewhat reduced in the next several years, the increase in student enrollments will probably have the effect of leveling their absolute numbers. The fact that all secondary instruction (excepting Arabic literature) is taught in la francophone, coupled with heavy use of that language in the primary schools and its exclusive use in higher education, will probably dictate a continued involvement of a good many French teachers in the Tunisian system. There is, however, some political pressure to "Tunisify" the schools, which could lead to quite different historical outcomes. At the moment the result is incalculable.

The number of different vocational and Lycée schools is around 160. Their architectural and construction characteristics vary widely, as do their ages, classroom complements and equippages. It is reported that last year witnessed the opening of nine new secondary schools as well as the enlargement of 32 others. Others are yet under construction or in plan. Most secondary schools consist of

a number of separate classrooms equipped with blackboards, teachers, desks, and student desks (for two or three pupils on a common bench). Depending on the subject taught, there may also be special facilities and materials. Most schools also are reported to have shops and other specially equipped quarters for technical/vocational students. (The kinds and qualities of science laboratories are not known to those who conducted this present preliminary study.) An unspecified number of secondary schools have dormitories attached for students who do not live close by.

A teacher in the secondary program is generally termed a professeur. The modes of teaching he uses appear to include lecturing and drill, with practical exercise in technical, vocational and perhaps scientific subjects. The secondary level teachers are reputed to be more capable than their primary colleagues, but of course no reliable measure exists.

The secondary schools, just as the primary schools, are now confronted by a serious and growing shortage of competently trained Tunisian teachers. The growth of programs, the increase of politico-social pressures for universal primary/secondary education and the general population rise have combined to make the rather modest flow of candidates from the several teacher training programs evermore inadequate. Accurate figures of this shortage are not available however, probably because of the rapidly changing nature of the historic/political flux from which the problem is generated. There are too many variables and imponderables for reliable predictions to be made. Even so, it is everywhere conceded that the shortage is now serious and will soon become critical. A deficit

of 3,000 is mentioned for the year 1970, a figure which apparently excludes the "less-than-adequate" moniteurs from the count.

Formal Education: Higher

Higher Education in Tunisia is represented by a half dozen undergraduate-level institutions and a single university with both undergraduate and graduate programs. There are schools and institutes for the study of foreign languages, commerce, administration and management, and agriculture. These are relatively small units, located at various points around the country, the most important of which seems to be the agricultural school with an enrollment of about 210.

There are also two teacher-training institutions, one for producing first-cycle Lycée and Vocational-level secondary teachers (a two year program) and the other for graduating second-cycle Lycée teachers (a four year program). Last year the former school had an enrollment of 1,379, while the latter had only 113. In order to get a complete picture of teacher-training enrollments, however, one must add to these figures the numbers of students at the University of Tunis who are training in these same curricula. The University two-year program now has 720 enrolled and the four-year program claims 290. Obviously, the number of annual graduates from all these teacher-training programs is rather modest. One contributing factor could be the low salaries paid Tunisian teachers.

The University of Tunis was created in 1960 from a number of small, specialized schools which had been in existence from an earlier epoch. Present enrollment is 8,000. This is an increase of 14 per cent over last year. Twenty two per cent of the students currently enrolled are women. It is predicted that

about 50 per cent of those who enter will graduate from an appropriate level. There are various programs, undergraduate and graduate, in letters, science, law, medicine, economics and education. A great part of the faculty is French, and that language dominates all instruction and study.

The facilities used in higher education are dispersed and various, with no clear pattern of construction styles, age, classroom design and the like. Much new construction is underway and in plan, particularly at the University. A large, impressive campus is now being built at the western edge of Tunis to augment the "downtown" campus, which is a rather motley collection of more-or-less old commercial structures.

The institutions of higher education are administered by the Secretariat of National Education. The nature of this central "control" is not clear.

Extra-Scholastic: Kindergarten

The Secretariat of Youth, Sports and Social Affairs has devised a kindergarten program which is considerably dependent on local resources for construction and support. This is quite unlike all the other educational programs, both formal and extra-scholastic, which are altogether dependent on national resources. Under terms of the arrangement, local communities provide a plot of land for, and a share of the cost toward, the construction of an adequate building for kindergarten operations and other community purposes. Once the facility is erected, the local community must provide salaries for the full-time "teachers." SYSSA funds are made available to buy special equipment and materials and to provide sanitary inspection and program guidance.

The program itself is designed to offer pre-school age children a three-year sequence of "disciplined learning" in such areas as cleanliness, order, sensory development and recognition of seeing the Arabic alphabet. It has been loosely compared with the Montessori pre-schools in Italy.

Several Peace Corpsmen are presently associated with the program, which reaches into 280 communities/neighborhoods. Most of the kindergartens now in operation are located in the populous and "urbanized" northeastern coastal region. (The Secretariat is trying to stimulate local interest in the rural areas.) The quality of "teaching" in the program currently is not likely to be very high, because the full-time staff persons employed do not seem to have access to any really thoughtful pre-service or in-service training.

Extra-Scholastic: Vocational Training

As has been indicated, there are each year many young Tunisians who drop out of primary school altogether or fail to qualify for one of the secondary programs. The policy of GOT is to provide these young people vocational training which would enable them to become productive citizens. The same policy extends to young persons and adults who have never been to school at all and lack labor skills. The vocational (or trades) aspect of this policy has been assigned to the Secretariat of Youth, Sports and Social Affairs.

The Secretariat operates a number of Vocational Training Centers across the country, mainly in the larger towns. These are divided into two sorts: the Adult Training Centers are for young men 18 and above, and the Pre-apprentice Centers are for boys 14 to 18. Generally speaking, the nature of training is similar

for both groups. The Secretariat indicates that there are now nearly 80 such Centers, the great preponderance of which are for use in the pre-apprentice program. It is alleged that the Centers are adequately equipped with shops, classroom and work areas suitable to the skills taught. The instructor force is apparently made up of trades practitioners rather than teachers. The overall efficiency of the whole program was not able to be documented in this current inquiry. Nor were enrollment figures available, although it would appear that several thousand persons are involved in one way or another during the current year.

The vocational skills "available" have great range: plumbing, woodworking, auto repair, electricity, welding, machine tooling, etc. The Secretariat, which also operates the national employment service, boasts of a very effective placement program for persons who complete the trades training. Some trainees go into an apprenticed position, others undertake direct employment.

The Secretariat also has programs for employed adults in-service. At a dozen or so Centers around the country, semi-skilled and low-skilled workers may take vocational "up-grade" training in connection with their regular jobs. These Centers are also supposed to be well equipped and adequately staffed with skilled craftsmen. The subjects taught range from diesel repair to maintenance of agricultural machinery.

Yet another Secretariat program centers around training masons for construction jobs. This particular effort seems to be an on-the-job training arrangement, not involving any instructional facilities or special staff.

In all of these programs, the students are required to attend appropriate literacy classes (in Arabic), conducted by "lay" personnel from the Vocational Training Centers or, in some cases, by pedagogical personnel supplied from the literacy program of the Secretariat of Cultural Affairs and Information. We were unable to uncover the precise operating patterns of this aspect of the extra-scholastic vocational training effort, although it is not likely that they would be of much consequence for the present study.

While most of the vocational training programs operated out-of-school are for boys and men, there are some interesting undertakings for young girls who have not attended school and who need employment. With the cooperation of several of the secretariats, special rug-weaving, sewing and domestic arts centers have been established in various communities. The girls live at the centers, learn to read and write Arabic and are trained in one or more of these "gentler" pursuits. The girls who learn the craft of rug-weaving can move into "commercial" enterprises which are now trying to develop this ancient Tunisian skill into an important source of export products. We gathered that the girls who specialize in the simple skills of "hearth and home" return to their towns and villages to become wives and mothers, rather than members of the national labor force.

Extra Scholastic: Agricultural Training

The imparting of agricultural skills out of the school setting is the responsibility of the Secretariat of Plan and National Economy, in which unit the Department of Agriculture falls. Until this year, this GOT unit had responsibility for all agricultural training, formal and extra-scholastic, but a realignment of

functions shifted the formal components (secondary and high level) over to the Secretariat of National Education.

Even though Tunisia is predominantly an agricultural country, the extension of practical knowledge about modern farming to rural families has not been developed to the extent that might be expected. Instead, the great emphasis in agricultural training seems to have been on the development of persons who could manage, or help run, the large cooperative farms organized from former French colon plantations. This is not to say that there have been no "vo-ag" programs of wider aim. There have been, but not with the kinds of resources really needed to make them genuinely effective. The average Tunisian farmer is largely lacking in the skills needed to apply modern methods to his crop production.

Over 1 million hectares of arable land, about one-third the nation's total, are planned for operation as cooperative farms. In addition to the 50,000 families that are or will be located on these, there are some 276,000 individually-owned farms. The opportunities for increasing agricultural production through extension education in improved farming methods are believed very attractive. A recent study has estimated that the nation's wheat crop would be increased by one-third if farmers in the unassisted group were to increase their yields by an average of 100 kilos per hectare.[7/] The new short-stem wheat varieties now being introduced in Tunisia can easily make this possible, when producers learn and adopt the required new cropping practices.

7/ Agricultural Credit in Tunisia. A report prepared for USAID-Tunisia by Russell B. Gregg, U.S. Department of Agriculture, 1967.

Official agricultural extension activity is headed centrally by the Under Secretary of State for Agriculture, in the Secretariat of State for the Plan and the National Economy. In each of the 13 governorates (or provinces), there is then a Regional Commissioner of Agriculture, together with a small technical staff. His staff includes a well-trained agricultural specialist, and several agricultural engineers. Within this structure, at the local or sheikhate level, there are a small number of agricultural monitors with much less training. These monitors are the part of the extension organization which comes in direct contact with the cooperatives and individual farmers.

The need for immediate improvement and expansion of educational work with farmers is underlined by the GOT's current plans for introduction and promotion of short-stemmed wheat varieties, with assistance of the Rockefeller Foundation and AID. Demonstration of the new varieties, especially suitable for Tunisian conditions, started in March 1968, at planting time, and will continue through succeeding seasons. The new types of wheat have the potential of making Tunisia almost self-sufficient in wheat production within less than five years.

The hoped-for breakthrough in Tunisian wheat production, to be made possible through research-developed wheat varieties and vigorous extension education, is also expected to have importance for other North African countries. Plans for a regional center for North African wheat improvement are now being considered by the Rockefeller Foundation and the countries directly concerned.

Extension of knowledge to farm operators, officials, and the public can be greatly facilitated through effective use of television. Filmed material can be of

exceptional usefulness in meetings of agricultural technicians and monitors with groups of wheat producers. Description of the new varieties by radio, encouragement for wider adoption, description of recommended practices and similar informational aid by this medium can play a further important part in the total extension task.

Though the new wheat effort is a major focus of current use of modern communication and educational technology, these are also needed in many other aspects of agricultural extension education. Better educational materials and wider dissemination of knowledge regarding improved farming practices would make possible significant gains in food production -- in crop yields, animal production, and marketing efficiency. Special promotion is needed for interplanting of horse beans with orchard and tree crops, control of brucellosis, and expansion of artificial insemination for livestock.

If television and radio programming on key production topics could be timed to capitalize so far as possible upon the weekly market days held in numerous agricultural villages and towns, wider and more frequent contact with farmers would be assured. The possibility of organized local discussion programs in connection with these presentations should be considered, as a part of more regularized extension work.

An AID/Tunisia agricultural specialist estimates that more than two-thirds of Tunisia's farm operators and farm families live in the northern areas of the country already served by present television broadcasting facilities. Though most individual families lack television receivers, a large proportion of them can be reached through village and town receiving sets, located in existing community centers.

Extra-Scholastic: Literacy and Cultural Training

The Literacy and Cultural Training program of the Secretariat of Cultural Affairs and Information is large, highly visible and well-supported. It is also the only educational effort now making use of television.

At the time of independence, about three quarters of the Tunisian population was illiterate. The new government set as one of its prime objectives the rapid reduction of that figure. Over the years, several large-scale campaigns have been waged, with the result that that now the government claims that only about 50 per cent of the population is illiterate.[8/] (Of course, the literacy effort is not alone responsible for the reduction. The death rate and widening patterns of primary school attendance also contributed to the lower statistic.)

Several years ago, the whole literacy drive was united under SCAI's Office of Social Education, with responsibility for operations in the military service assigned the Secretariat of National Defense. OSE, which is staffed with a cadre of energetic and dedicated people, has spared no effort in organizing thousands of classes for all ages and both sexes in every section of the nation. School dropouts, the unschooled, resettled bedouins, village wives, factory workers, field hands and countless other groups and categories have been organized into day and evening classes, although the stronger emphasis has been on training employed workers to read and write (in Arabic).

Last year over 15,000 people were enrolled in classes. There were 300 local centers, staffed by 575 "teachers." Over 4,000 students passed a final examination, offered at the end of the two-year course.

[8/] Only AID figures indicate the illiteracy rate may range from 65-75%. (Reference: Tunisia Summary of Basic Data, AID (PPC/SRD), July 1967.)

It would be a mistake to infer too much about the learning efficiency of the program from these statistics or from an observation of the organizational dynamics which are indeed impressive per se. There is a clear unevenness in the quality of the "teaching" in the many literacy classes. While a good percentage of the "teachers" have been drawn from regular schools (itself no guarantee of quality instruction many others have been recruited from the ranks of enthusiastic and literate patriots interested in contributing to the national development and perhaps earning a few extr dinars as well. There seems to be a strong evidence that the pedagogical methods used by most of these "teachers" are rigidly those of rote-learning. True functional learning is certainly not universal throughout the program. This deficit takes on added significance when it is reported that the literacy program comprehends not only "reading and writing Arabic" but also simple computation, fundamental Tunisia history, geography, civics, economics, and religion (morals). In these latter "content" compartments, the stated aim of the program is to encourage "creative understanding" as well as to impart organized facts. The techniques of rote-learnin employed so often do not seem to lead to any impressive achievement of such. In fact, even the learning of the simple, literate skills appears less efficient than it might be if the quality of instruction were more suitable to the task.

The classes meet in a variety of facilities: party headquarters, community centers, regular schools, special literacy centers, cooperative farm assembly halls, etc. Usually, the classroom spaces contain chairs, desks, and a blackboard. Electricity seems to be almost universal, although a single, naked light bulb suspended from a high ceiling is apt to be the only source of illumination for night

classes. OSE distributes to all centers various text and worksheets which serve as carriers of course content. Once a month a little newspaper is also distributed to "advanced" students. It is made up of simply written articles on current affairs, party policy and health. Generally students use hand-slates rather than paper and pencil.

It would appear that most students become quite proficient at making the Arabic letters and numbers, but not so proficient at "manipulating" them in situations somewhat unlike that of the immediate memorization circumstances. Whether or not the preponderance of students who get through the training go on to read the road signs, daily papers or instruction sheets found in daily life is not clearly established.

OSE is currently "experimenting" with the use of televised lesson materials in the literacy program. Lesson units of 15-30 minutes are transmitted each night on the two channels now in operation in the Tunis-to-Sousse region. These telecasts are received on large-screen TV sets placed in many of the classrooms used for literacy training. Two lessons each week deal directly with reading, writing and cyphering. The three others consist of illustrated lectures on civics, geography and the other cultural components of the total course.

The lessons are planned and produced by a special team of "experts" assembled from OSE, the University, and R-TT. They can be described simply as being astonishingly similar to the kinds of instructional programs done on American ETV in the mid-1950's. Little attention has been paid the essential characteristics of the learners. The program tone is passive, the pace is brisk, the montage

is basically theatrical. There is much of the "show" and little of the lesson. The reinforcement activities to follow the telecast are not well thought out and, thus, are badly executed. (Actually, half of the TV classes have no follow-up period in consequence of an "experimental design" to see which process is more effective.) These criticisms did not come only from our observation; they were collected by OSE from participants in the program itself. Whether or not the production team has the expertise to act on them wisely is doubtful. An appreciation of the value of sound methodology is as little apparent in extra-scholastic circles as in the formal educational establishment. The encouraging thing may be the seeming willingness of the Tunisians to accept new ideas when they are demonstrably important to some aspect of the national development.

Extra-Scholastic: Homemaking Training

The Secretariat of Youth, Sports and Social Affairs is responsible for a broad-gauge program of "social action" which includes certain training projects for young women who need to learn simple homemaking and personal skills. At various community centers and women's clubs, classes of young women are assembled for the purpose of extending practical knowledge of nutrition, cooking, sewing, hygiene, family planning, child care and the like. The instructors, termed animatrices, are young women who have had at least a year or so of secondary level schooling. The efficiency of the whole program is very much suspect, primarily because of the lack of properly trained animatrices. (It is apparently the view of the Secretariat that television and other mass media could be assistive in training the animatrices, carrying direct instruction to the homemaking classes, and

motivating more women to attend the programs.) While current enrollments in the classes were not available, it was estimated that several thousand women participate in some fashion.

Extra-Scholastic: Family Planning and Public Health

While the social action classes of the homemaking program operated by SYSSA contain some "health and family planning" content, they are understandably not considered suitable to serve as the only such training contacts with the population as a whole. The Secretariat of Public Health feels responsibility for building other communication bridges to carry training information on these subjects to the people. Consequently, various plans are now in talking consideration for establishing an elaborate scheme of in-service training for local social workers who will be able to carry the "health and family planning" message to the masses.

Family Planning

The purpose of the Family Planning program is to help slow the rapid increase in population. To spearhead this program, a new Bureau of Family Planning, with a full-time director, was established in February, 1968, under the Secretariat of State for Public Health.

At present, population in Tunisia is increasing between 2 and 3 per cent per year, steadily adding to the pressure upon its resources for food production, education, employment, and social services. At the existing rate of rise, the population of some 4.5 million now in being would double in 28 years. Though Tunisia has made striking progress in its development programs, the increase in population is so rapid as to reduce and threaten the per capita improvements that are the central core of development.

Field action in this relatively new program is carried out through special field representatives in each governorate, and through 13 mobile teams. The field representatives, members of l'Union Nationale de Femmes de Tunisie, visit each village and town in advance of the mobile technical teams to explain the purpose of family planning and encourage its adoption. The mobile team follows, providing services and supplies for families desiring to participate. The team consists of a doctor, a nurse, a midwife, and a projectionist for showing visual education materials.

Additional field action is also being launched through family education work with mothers (postpartum) in the 30 principal hospitals of the country, as well as in clinics in the major cities and towns. AID and the Ford Foundation are rendering assistance in the postpartum program and in other aspects of the total activity. In its first year of full operation, beginning in April 1966, principal emphasis was given to introduction of the IUD contraceptive device. This emphasis has recently begun shifting to use of contraceptive pills, owing to difficulties encountered by numerous women in using the IUD. (Specialists in the family planning field believe much of the reported disattisfaction with the IUD is a result of inadequate preparatory education and instruction for individual adopters of the IUD, rather than unsuitability of the device itself. This conforms with the experience in use of the IUD in several other countries.)

Success of the Tunisian family planning program depends upon extensive public education as to the need for family planning, in terms of family welfare, maternal and child health, education, and economic progress for the nation. It

also depends on the adequate flow of information to "adopters and prospective adopters" as to the temporary effects which may be associated with the use of contraceptives such as pills and IUDs, the relative reliability of the various methods available, and the availability of services and supplies at clinics and other locations.

Television and radio support for the required educational effort is considered by some officials to be essential if this necessary information is to reach the majority of the Tunisian people with the needed speed and frequency. The regular use of television and radio, as well as of newspapers, is probably required for rapid creation and maintenance of the needed "climate of opinion" in Tunisia favorable to family planning. It is wholly necessary for adequate dissemination of program facts.

Thus far, television and radio support has been limited to occasional references within other contexts and to reporting official policies and pronouncements on family planning. Tunisian newspapers and magazines have given similar constructive support. The help of these media to this point have been vital and will continue to be so. However, the assistance of television and radio will need to move into frequent and specific presentation of information if they are to render the support which the government wishes to bring to family planning.

Public Health

Modern public health services embody many features, including health testing and reporting, medical services, hospital services, family planning,

sanitation, and hygiene. Preventive services, as distinct from curative, are always heavily dependent on education of the people as to the need for particular practices, the nature of the measures that are recommended, and the means that are available for carrying them out.

Television can plan an important part in advancing public education in this field. Together with effective use of radio, beneficial knowledge can be carried quickly and frequently to the whole public, including persons who are illiterate. In this case, the contribution of television as a new and visual medium can become extremely important.

Summary of Needs

In some countries there is a confusion of purpose and an uncertainty about educational objectives and national goals. This is not the case in Tunisia. Tunisia is a relatively small nation with a basically agricultural economy that has set about "modernizing" itself and improving the lot of its people in a hurry. It has in the past ten years successfully started to revolutionize its traditional Arabic customs and to become independent of foreign (particularly French) domination, both socio-psychological and economic.

An unique complex system of organization has been developed to move toward realization of goals. The President has unusual powers to make and enforce decisions independent of the Government, but it is paralleled by a governmental structure to make decisions as well. An extensive network of single party organization reaching to each village and settlement further parallels the President and the formal government structure. In education, everyone in Government has an interest and role. All believe in education and are about its business.

Nevertheless, determination and conviction to reform are not the only ingredients necessary to accomplish significant and comprehensive educational advances. The conditions under which the present efforts to improve are being conducted greatly inhibit dramatic achievement and there is little within the present resources or within the means available to use them which gives reason for expecting more productive outcomes in the future.

The problems and weaknesses in the present programs have been cited in previous pages. However, it is useful to consider altogether a sample of those in formal education to grasp fully the dimension of the conditions that must be ameliorated before any substantial improvement can be predicted.

a) Primary teachers who must teach in French have less than adequate French speaking ability.

b) The use of instructional materials is limited, because the materials themselves are sparse and there is no teacher training in the use of them.

c) Rote teaching-learning techniques are used in nearly all subjects.

d) It takes approximately 8 years for the average Tunisian youngster to complete 6 years of schooling.

e) The addition of new subjects is not feasible; only through U.S. Peace Corps Volunteers can English be taught in a small number of schools.

f) The relationship of textbook materials to courses of study is not much in evidence, although there are efforts to make it more relevant.

g) A predicted shortage of 3,000 teachers by 1970 does not even include those who are currently identified as unqualified or incompetent.

h) Kindergarten programs are conducted in only 280 centers in urbanized sections of northeastern Tunisia and teachers in the program have no in-service or pre-service training.

Catalogued according to kinds of problems confronting educational development in Tunisia, we see the following general areas of concern:

a) limited teaching resources

b) variously qualified personnel

c) increasing demands for student achievement

d) increasing numbers of students

e) methodological inability to determine and seek specific learning objectives that are realistic and relevant.

Lists of problems beget priorities and the usual approach to consideration of such problems as have been cited here is to select one or two which appear to have manageable solutions and attempt to "solve" them. It is customary, therefore, to project needs in a study of this type by estimating the need for a certain number of teachers, a certain number of classrooms, textbooks, and other resources. These are unquestionably important considerations, but they do not lead to functional prescriptions for improving educational achievement. The limitation of such projections is that they assume the present instructional strategies are valid and will function optimally when all positions are filled, all classrooms are built, and all resources are available.

What is there about the present instructional strategies that raises questions about their validity? Essentially, it is a question of realistic expectation about the burden that one individual, the adult in the classroom with the students, can or should carry. Consider what it would mean if the entire responsibility for improving education must funnel through the individual teacher in each classroom group of 45-60 youngsters. First, there are not enough teachers. So let us suppose that through some magic pronouncement there were enough "qualified teachers" to fill the primary schools. Even with this injection, there would be no means by which their qualifications could grow to expand with advancing knowledge and methodology, and instruction would quickly be out of date and irrelevant. Beyond this, the magic pronouncement has dealt with only one problem: it has not generated enough teachers to grow with the expanding student population; there has been no expansion of any teaching resources; and among other deficiencies, there has been no effort to improve the determination and specification of learning objectives.

Magic pronouncements aside, the facts of the matter are that the number of students in Tunisia is increasing more rapidly than the number of well-trained, truly competent teachers, and the resources for accelerating student learning and achievement cannot be multiplied at a rate that will equal the demand for them.

At a certain point the numbers of students, teachers, and subjects combine to present a situation which can not be redressed by the traditional educational methods. Under the best circumstances, the self-contained teacher in the self-contained classroom is never the sole hope of achieving dramatic

educational advances. Under the circumstances in Tunisia where educational qualifications and resources throughout the country are in short supply, comprehensive educational improvement can only come from a system of education that deals simultaneously with the major problem areas that have been identified and specified here.

Taken on a school-by-school basis, conventional instructional techniques might be made to be effective, but considered on a nationwide basis, we have not only more of the problem, but a different problem caused by the actual numbers and the rates of growth.*/ Considered as a problem throughout Tunisia, the amount of information, the need for more effective teaching procedures, the numbers of students, and the limited availability of teaching resources requires a different solution than might be appropriate if the concern were only among a few schools.

It has not been possible thus far to envision a procedure that would help overcome the inequalities and inadequacies that exist throughout Tunisian education as long as traditional standards of school relationships and responsibilities remain the guiding factors and constraints of planning. It is reasonable to suggest that any effective development that seeks to achieve a higher quality of instruction and equality of learning opportunity must be based upon full recognition of all factors that constitute the total problem.

The need in Tunisia, therefore, at this time, is not to set forth projected requirements for specific numbers of personnel or facilities, but first to describe

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*/ For example, crossing the United States state-by-state presents a different transportation need from making the trip non-stop. The technology to accomplish one objective differs from that to accomplish the other. The automobile, bus, or train that would be suitable for the former trip would be entirely unsuitable for the non-stop journey.

the kind of educational system that will accommodate changing conditions and changing requirements. The need is to devise a system that will simultaneously enable the Government of Tunisia to cope with advancing knowledge, increasing numbers of students, relative decrease in the number of competent teachers, in-service education needs, and improvement of teaching resources, all within limited financial resources.

The system needs to redefine both national and local leadership responsibilities. It will need to facilitate a centralized and coordinated effort to establish adequate standards of achievement and to provide learning materials that will make it possible to attain such standards. It also needs to supply the local schools with the necessary subject matter and methodological expertise to provide the base for adequate use of such learning materials. And it requires the establishment of a method of communication that will make such expertise equally available to all schools and all classrooms.

WHAT IS IT POSSIBLE TO DO?

The Present Study

The present study was initiated by the Agency for International Development for two main reasons. First it was believed that an ongoing program of literacy education in Tunisia, which was being conducted by means of television, should be examined with regard to its own achievements, as well as the potential application of this technique to other levels of adult education and training. Second, in accordance with the recommendations of the White House Task Force on ETV in Developing Countries, the potential usefulness of television for comprehensive management of more effective instructional efforts in basic education was to be fully investigated.

In both instances, it has been possible to study general conditions governing the education programs, the climate for suggesting new approaches and procedures, and the attitudes held concerning innovative communications technology and education.

The present study was conducted by NAEB for AID with a genuinely high level of cordiality and helpfulness on the part of numerous officials from AID and GOT. However, it is important to note that during the contacts with the Tunisians it was always asserted that the team had come merely to collect facts about various educational programs - especially those which might incorporate telecommunications techniques - perhaps with an eye to locating possible opportunities for future U.S. assistance. The credentials of the team members as well as the agenda itself made it manifestly clear that a special emphasis was being placed on the uses of television to forward instructional and social objectives.

The GOT officials who cooperated in furnishing the study group with information about educational activities were not brought into any coherent examination of the potentials of using television technology systematically to facilitate significant methodological improvements in the actual programs with which they were concerned. Nor were they involved in analyzing the kinds of administrative commitments realistically required to effect a new teaching-learning process based on technology.

If it had been assumed that detailed planning could be undertaken without full participation from local Tunisian educators and planners it is important that this assumption be re-evaluated. Serious educational development is so comprehensive and so involved with every aspect of a country's planning and long-range commitment that it can not be properly and effectively prescribed or implemented without intensive participation of the appropriate government officials, starting with the chief executive.

In no instance has it been possible to set forth detailed plans of development and action. Such plans should and can only derive from joint study and consultation among qualified professional advisors, Tunisian officials who will be implementing a plan, and appropriate United States officials. For this reason, a plan which is offered by the United States instead of developed by the Tunisians with United States assistance, can be expected not to succeed.

Accordingly, the suggestions included in this report are only illustrative of what it might be possible to accomplish. They are not, at this point, specific recommendations for they do not have the background and input from Tunisian officials that would be required for them to be detailed prescriptions for educational development.

What Good Can Educational Television Do In Tunisia?

The label "ETV" has been applied to a great many situations in which television is used for some worthy service that by one definition or another can be considered educational. The general phrase educational television is often further defined as instructional television to denote the specific use of the medium for direct instruction. Within this narrower definition of educational television there are a variety of uses.

At one end of the continuum is the use of instructional television to provide supplementary materials selected by a classroom teacher when it is felt that the telecasts will bring something extra to the instructional experience. In this situation, television is used to add materials to the instructional program, but the regular instructional pattern remains unchanged.

At the other end of the continuum, television has been used as a central means for making available the core of an entire instructional program. This has applied to its use in the primary schools, or in the secondary schools, or both. In this sense, television and adjunct classroom activities are seen as one task with several aspects that interact with each other, and the purpose of such usage is to effect explicit and widespread modification of traditional instructional procedures.

Although most educational television systems can be used for a variety of purposes, it is this latter application which allows television to be seen as a device that will lead educators away from the constraints and inadequacies of traditional procedures. Such an expectation is, in fact, one reason for the present study, because there is evidence to suggest that the communications

potential of television-radio systems can help educational planners deal with many of the weaknesses and conditions that have been found in Tunisia.

Experience has demonstrated that systematic application of communication technology to comprehensive educational problems does provide the basis for developing new and economical means for coping with them. Technology can be used to communicate instructional material that is organized, authoritatively documented and carefully planned. Because a teacher who presents a lesson through radio or television can share with teachers who are in classrooms the responsibility for making the lesson effective, there is the means for implementing new instructional strategies in the schools or in other places where education and training must be conducted.

Whereas the current system requires that the "teacher" be the only adult in the classroom with the student, through television and radio it is possible to bring to a student several specialists who, together with the classroom teacher, serve as "the" teacher.

Whereas the standard dimensions of a classroom have limited the teaching resources that can be effectively used throughout a school, through television and radio it is possible to transport to the classroom many different experiences, many specially qualified teachers, and many new opportunities that are not now available to the majority of the students.

While it is premature to articulate or propose specific plans, it is possible to indicate the way in which an educational television system can be designed to meet the needs that have been identified in this study.

The use of radio and television for instruction in Tunisia must relate to three important objectives. The first is to improve the quality of instruction,

make the presentation of subject matter and the development of concepts more meaningful, and hence make learning more effective and more functional. The second is to expand and amplify limited instructional resources, and thereby equalize learning opportunities among a great many learners. The third is to make education available in full measure to more people within the limits of financial feasibility. To achieve these objectives, instructional radio and television, together with supporting electronic media are seen not merely as means for transmitting instructional material but rather as basic logistical and cybernetic instruments for developing and accelerating improved approaches to the management of educational efforts, to the design of instructional strategies, to the use of teaching personnel and teaching material, and to the economical use of limited resources.

To perceive the suitability of radio and television-based electronic media systems for effectively achieving instructional purposes, it is necessary to identify the instructional process which they facilitate.

Broadcasting*/ in itself is a method of electronic communication by sight and sound. It has instructional value only to the extent that it is used systematically for specific ends. Anything which can be learned by means of certain kinds of symbols can be taught through a medium capable of handling those symbols. The range of aural and visual symbols available through the electronic media is, of course, very wide indeed. The electronic hardware, therefore, makes possible

*/ The word broadcasting is used in a general sense and does not necessarily mean a specific kind of transmission system. As indicated in a later section, there are many different arrangements that can be made for transmitting television signals from one place to another. Carefully engineered technical systems often use a combination of transmission modes to achieve desired coverage.

the development of a variety of new ways to communicate ideas and understandings more effectively, and at the same time can make full use of other media (printed material, moving pictures, photographs, audio tape, etc.) more economically.

The instructional process based on broadcasting technology is basically cooperative. It requires close cooperation among personnel in three major elements of the system -- the instructional design team, the classroom teachers and supervisors, and the technicians. The whole process is team teaching in the largest and broadest sense. It is the resultant coordination that is the main advantage of the process, the combining of appropriate skills and talents into the development, presentation, and reinforcement of instructional experiences.

The lesson that is broadcast is not just the material that is developed and presented through the radio or television system; it should consist also of the follow-up activities and reinforcement procedures that take place in the classroom. For each lesson that is presented through a broadcast, the instructional design team should plan a total lesson that includes that which will be broadcast, definite suggestions for the classroom teacher and the students to prepare for the broadcast element, organized instructions for reinforcement activities in the classroom to follow, and a suggested list of related reading material consistent with the level of achievement.

The strength of this approach is that it provides all classroom teachers in the system with the same basic, minimum core of material and supplies them with procedures for student motivation, identification and reinforcement; but it can allow sufficient latitude for individual initiative and for differences between

class groups. No such advantages exist for the classroom teacher at present; instead each teacher functions independently, usually without any relevant resources, or the awareness that they are lacking.

The process suggested here also makes it possible for the instructional design team to plan carefully for the proper scope and sequence of each lesson, and to evaluate "feed-back" information that the classroom teachers and supervisors should, as part of the overall system, send to the design team on a regular systematic basis.

It is this constant communication and interaction between the teaching specialists in the studio and the teaching specialists in the classrooms that make continuing evaluation and modification of instructional material and procedures possible and effective. It is really the central characteristic of the instructional process that broadcasting and electronic inter-communication makes possible.

To the extent that instruction made available by means of the electronic media provides the core instructional program for an education system, it is possible to develop cross-disciplinary techniques that will tend to provide greater learning opportunities. If, in Tunisia, optimum or maximum use is made of these instructional techniques, the centrally-housed instructional design teams in the various subject areas are in close touch with each other and are in a position to compare related concepts and supporting information, and so plan lessons that each discipline tends to support and reinforce another.

This characteristic could be vitally important in Tunisian formal education, because it would allow instruction in the French language (or in standard Arabic)

to be integrated with other subjects on a highly systematic and linguistically reinforcing basis. Vocabulary, syntax, flexion and concept development could be carefully regulated as to level and pace within all classroom activities - and on a nationwide scale. At the present time, no such systematic integration of language is found or is possible.

It is also possible in this cooperative process to develop and distribute special materials for teacher training. These materials can deal with specific courses that are to be taught in coming days or weeks and with teaching techniques and other information that will be important to communicate to the teachers.

It should be clear from this exposition that radio and television together with supporting media make it feasible to implement new techniques and systems that are required for organizing, presenting and distributing instructional materials. It is possible, therefore, to consider an entirely new level of educational objectives if these media are systematically and extensively employed.

How Such a System Might Work

In order for this kind of cooperative educational planning to function, there needs to be within the Government of Tunisia a group of specialists which would have as its on-going professional task the operational design and development of various educational programs undertaken by the secretariats. Under such a scheme, a staff of well-trained communications, pedagogical and academic specialists, armed with telecommunications resources and organizational means, would be responsible for carefully mapping out and implementing highly efficient learning strategies which could realistically achieve objectives specified by those organs of government charged with effecting social, economic and educational results pertinent to the national development. The main focus of such functions

would be the demonstrable improvement of current educational programs and the efficient inauguration of new ones.

These professional specialists in instructional design and educational planning would provide the following interrelated functions:

1) Administration - responsible for a) consulting with the GOT executive sector to determine those high priority educational efforts which should receive assistance, b) helping government units establish realistic objectives, budgets, and other policy specifications germane to the projects selected, and c) managing whatever internal operations may be appropriate.

2) Planification - responsibility for planning out, designing in fine operational detail and guiding the implementation of the instructional strategies appropriate for each educational task. The section would maintain intimate working liaison with the various government units actually charged with operating educational programs, but especially the curriculum authorities in the Secretariat of National Education.

In this "core" section might be found a staff of highly-trained educational planners (sometimes labeled in the U.S. as educational communications specialists, instructional technologists, instructional designers or educational programmers). Each of these persons would have to have professional skills in such areas as communications theory and practice, learning psychology, media design, teaching methods and practices, systems analysis, program planning and budgeting and television production/direction.

3. Realisation (Production) - responsible for actually producing the required electronic, photographic, topographic, graphic and other mediating elements specified. The emphasis would be on televised materials, with the other elements as supporting complementary ingredients in the overall learning strategy devised.

In this section might be found a variety of media specialists such as TV/Radio directors, switchers, photographers, graphic artists, text writers, master printers, etc. Under these para-professionals might be grouped various media technicians such as TV cameramen, audio operators, floor managers, photo processors, pressmen, draftsmen, carpenters and the like.

4) Operations - responsible for the technical operation and maintenance of any communications machinery specifically related to the educational programs (including TV receivers, videotape recorders, TV cameras, etc.).

In this section might be found graduate engineers as well as a number of electronic technicians. The section would be headed by a highly competent engineer who could supervise the selection and orientation of new staff, the coordination of technical processes with the work schedules of the other sections, and the procurement, installation and maintenance of all communications devices.

5) Animation (Utilization) - responsible for a) coordinating with appropriate government units and the party the organization of the various local resources (facilities, personnel and materials) needed to carry forward systematic adult (i.e., extra-scholastic) programs, b) advising on the promotion of adult education projects in such ways as would yield maximum participation by the target audiences, and c) training and monitoring local personnel organized to help conduct adult education efforts. In this section might be found promotional specialists trained in such appropriate techniques as group dynamics, audience specification, cadre training, counseling, publicity methods and the like. It is important that the Secretariat of National Education provide these animating functions for those efforts involving formal education, although the animation staff is needed to provide training and advisory assistance in this area.

6) Evaluation - responsible for designing and implementing appropriate testing and research schemes necessary to measure and increase the efficiency of educational programs.

In this section might be found professionally trained psychometrists skilled in techniques of diagnostic testing, research design, systems analysis programming and the like.

We would anticipate that the educational efforts which might be undertaken with this capability could involve the following operational steps. Assuming that some appropriate GOT unit (secretariat level or an internal component) had been charged by the executive sector with establishing general objectives for some comprehensive effort such as formal education, adult literacy education, agricultural extension, socialization, etc., then:

1) The proposed educational effort would be examined to identify specific ways in which it might be made effective through the use of television/radio to facilitate the kind of methodological strategy that has been described.

2) The subsequent recommendations about the potential plan would be submitted to the executive sector for appropriate action. These recommendations would usually include various analyses of project potentials, tentative input requisites and budget forecasts.

3) In those cases in which executive sector approval was given, the planification section would establish an intimate working liaison with the government unit charged with overall responsibility for conducting the program to be designed. In the instances of programs in the area of formal education, this liaison would be expected to take the form of design-teams made up of an educational strategy planner and psychometrist, along with a studio teacher and curriculum specialist assigned from SONE.

4) The general objectives originally set would be carefully recast as precise operational specifications against which a sound methodological design could

be made. There would be no attempt to modify the general goals except to make them as realistic and operable as possible.

5) Continuing to work intimately with GOT contacts (or within design-teams), the educational strategy planners would systematically analyze objectives, target audience characteristics and available inputs (personnel, space, facilities, materials, time, etc.) with an eye to developing an efficient technologically-facilitated learning strategy which would likely lead to a satisfactory outcome for the effort as a whole. The planner (or design-team) would map out the resulting strategy in considerable, operational detail especially with reference to the design of the in-service elements for the teachers, mediating materials and reinforcing experiences found to be required.

6) The planification section (or design-team) would begin working directly with the realisation, operation, animation and evaluation sections in actually implementing the strategy design. Television/radio materials and other mediating elements would be produced and disseminated on appropriate schedules; local facilities would be arranged and equipped (where necessary); local personnel would be identified, organized, oriented or trained; diagnostic testing instruments would be devised and checked out; etc. We would expect that formal education efforts would have a much more systematically structured design and implementation than other sorts of programs. Formal education efforts which make rational use of technological resources are best organized as cooperative undertakings in which all parties (design-team, classroom teachers, technicians, etc.) have mutually supportive, though distinctive roles.

7) As the overall effort moves forward into full operation, the educational planner (or design-team) would systematically monitor and modify the strategies

in ways contingent on actual outcomes, so that the methodologies could be rationally developmental rather than inflexible and rigid. Under this system, appropriate GOT authorities could easily be involved in this continual monitoring process in order for each program to have the benefit of close scrutiny by persons in leadership positions who were concerned with the contributions of education to the national development.

To carry out these functions would require certain articulated elements by which to conduct a wide range of administrative, design and development activities, including suitably-equipped spaces of the following kinds:

A) Office space for the director-general, section heads, consulting specialists, clerical staff, researchers, etc.

B) Media operations space for the production of television and radio programs, photographs, graphics, printed matter, models, etc.

C) Technical facilities space for the operation and maintenance of machines and devices needed for media production and distribution (including repair of TV receivers).

D) Data storage space for the orderly "librarying" of information items (books, pictures, films, etc.) needed in the preparation and production of educational materials.

E) Classroom and study space for the training, orientation and testing of personnel.

F) Distribution facilities space for any devices, materials and equipment which might be needed for the transmission, distribution or delivery of mediating materials/devices to

appropriate local users (adult education centers, schools, agricultural offices, etc.).

Capacities of the Educational and Technical Systems

Because there are no immediate plans for increasing the number of television-channels-per-area in Tunisia to more than the single one now under development, the question must be asked: can an effort to improve education methodology be built around such a limited transmission system? We believe the answer is affirmative, but qualified by some highly significant output constraints.

Assuming that general (i. e., non-instructional) programming is to be continued in the evening "prime time" periods, the single channel system could provide, at most, some 8-12 hours of instructionally-useful programming time per day. (The higher figure assumes transmission during early morning hours, a programming technique that may not, in fact, be very practicable in a country in which nearly all viewing is at community centers rather than in homes.)

Experience in other parts of the world has demonstrated to the NAEB that a programming capacity of these dimensions is woefully inadequate for comprehensive educational applications at the primary or secondary school levels. While a comprehensive service for formal education might not require so long a span of hours each day, such services would necessitate the non-repetitive transmission of various materials on from three to six different channels during a school day of about 6-7 hours duration. This means that during a five-day period, the workload of a comprehensive school service could involve up to 210 hours of non-repetitive

programming output. For the same time span, the R-TT network could provide no more than 35 hours.

The fact that the single-channel system is inadequate for comprehensive efforts in formal education does not bar its use for various extra-scholastic educational efforts. In fact, we believe that improving the adult literacy, agricultural and domestic training programs could be facilitated by the R-TT network now under development. (In the next section, we will discuss a service just for such purposes.)

Transmission schedule hours are not the only measures of programming output capacities. The various operational processes of the system described require trained personnel and equipped spaces at sufficient levels of magnitude to accomplish efficiently the specific educational tasks set. We believe there is a "critical mass" of these elements which can provide a general index for estimating input/output magnitudes.

We suggest that a minimum effort should involve the planning and implementation of educational undertakings which require no less than:

A) the work-daily production of 4-6 hours of videotaped programming for transmission over the single-channel Tunisian TV network, plus

B) the work-daily production of around 100,000 pages of accompanying printed matter (worksheets, text pages, tests, etc.), as well as

C) the production of an unspecified number of graphic and photographic "insertion" pieces; regular schedules of equipment and

receiver maintenance; various in-service conferences; and other such regular support activities.

A workload of this magnitude will require certain numbers and kinds of trained personnel and equipped spaces. These elements are listed in Appendix E.

In reviewing these elements it was clear to us that a great many of them were already present on the Tunisian telecommunications/education scene. Analysis showed that virtually all of the necessary equipped-spaces for television production were either already present at R-TT's downtown Tunis building or could be present by 1969 in the new TV Centre to be constructed on the western edge of the city. The Societe Anonyme Tunisienne de Production et d'Expansion Cinematrographique facility clearly had film capabilities well beyond any of the minimum requirements. The notable facilities exceptions might be for office space and the print shop.

We also found that skilled and semi-skilled personnel required were present in the existing labor force at R-TT or elsewhere in GOT units like SATPEC. Notably lacking, however, were the educational strategy planners, properly trained TV director/switchers and administrators. (There are probably good candidates for many of these positions in the new Division of Planning and Research of the Secretariat of National Education.)

Naturally, the mere presence of many of these elements in Tunisia does not mean that they could be rapidly re-assigned new functions without marked changes - or even dislocations - in some current R-TT/SONE activities. But it may mean that were GOT to become vitally aware of the high educational value of a system such as has been described to the many facets of national development,

their local availability could certainly be a facilitating factor in getting a proper program started.

As to lack of expertise in the area of educational design planning, we recognize that a sophisticated training program would have to be organized for an adequate number of likely Tunisian candidates, possibly chosen from SONE's Division of Planning and Research. This aspect of an initial development needs very thorough examination at the appropriate time.

Extra-Scholastic Applications

It appears to us that it would be feasible for the Government of Tunisia to organize an effort to improve the nationwide adult literacy project as well as various other non-scholastic educational programs. Making use of transmission hours available on the new R-TT network and drawing on as many existing resource elements as possible, such an effort, established with R-TT itself, could be brought into operation within a fairly short time and at moderate cost. */

The kind of system that has been described would be able to bring a much higher efficiency to the current literacy efforts by regulating the core of instruction to carefully developed learner-based needs. The limited teaching resources could be properly amplified throughout the major part of the country, and the advantage now seen for a televised literacy program could be greatly enhanced through adequate design of the instructional materials.

The same benefits could be extended to other extra-scholastic efforts in agricultural training, family planning, domestic science, cultural appreciation,

*/ Costs are estimated in a subsequent section.

and perhaps kindergarten. Each one of these programs was found to suffer from an inadequately developed nucleus of instructional material. What is available now is often ineptly prepared, irrelevant to the people who are to learn from it, or disseminated over only a limited area. The possibility of applying the technologically facilitated techniques of educational planning to extra-scholastic efforts should be carefully explored with GOT officials, for it could mean greatly increased effectiveness for several important educational projects currently underway.

Formal Education Applications

It has already been noted that the new R-TT network has insufficient output capacity around which to build a comprehensive effort to improve instruction at the primary and secondary school levels. But before considering the requirements for a system that would be adequate, it might be well to consider the question of trying to use electronic technology for a less than comprehensive effort in formal education.

This is an important question, for the absolute costs of educational systems that use electronic media are usually of a much greater magnitude than those for traditional educational systems. The capital outlay alone, seen as one large expense, usually leads to suggestions for partial approaches or experimental periods in which the medium is afforded the opportunity to be "tested" before a complete program is undertaken. This is a predictable and probably a natural response. However, it fails to acknowledge one of the main reasons for using communication technology to accelerate the achievement of educational objectives: that is, the more extensive the application, the lower the unit cost.

The economic factors will be discussed later, but they provide from the outset, a basic rationale for comprehensive implementation of communication technology to achieve the educational advantages it affords. Among the other factors it is important to know that the orientation and organization of teachers to use technology is a lengthy and difficult process. In the primary schools, for example, it would be awkward for an individual teacher to be carefully oriented to a new role in the use of the proposed system for the teaching of one subject, while all other instruction was carried on in a "business as usual" format. Thus, for the system to be used only for the teaching of a single grade, or for science throughout the elementary schools would neutralize the very reasons why a technologically-facilitated system was proposed.

It may help to understand this point by relating it to another kind of technology. For example, elevators make it possible to have high rise buildings without inconveniencing the tenants. Suppose cautious administrators argued that the elevator should be tested first to go from the first to the second floor, or only to the seventh floor. The chief advantages of the elevator as a means of transportation would be lost, and the cost of installing a high speed elevator to go only a limited distance or only to a selected level would be greater than the benefit received.

The same principle applies to the use of technology in programs of formal education. The reason for considering such applications is that they afford the means and the opportunity to effect widespread and comprehensive educational improvement. If prudence requires less than optimal implementation, a comprehensive technology will be used for a limited objective. That, in the long run, is where the unnecessary and excessive costs lie.

With regard to the dimensions of a plan that could effectively improve instruction in formal education on a truly comprehensive basis, it is necessary to make some generalizations. It is NAEB's experience that each grade level needs about half the programming output of a single transmitter on each school day. This would mean that the six-grade primary program in Tunisia might require three transmitters-in-each-area, each one assigned to carry the programming loads of two grades. (These general figures include times scheduled for administrative and in-service programming elements for teachers as well as for in-class lesson elements.)

Roughly speaking, each of the "channels" would require staff and equipped spaces approximately of the kinds and magnitude indicated as "critical mass" minimums in a previous section, and listed in Appendix E. Of course, certain combinations of staff and facilities would somewhat reduce the totals, but such precise detail is incalcuable at this stage of discussion. Suffice it to say here that adding "channels" necessitates adding planning, production and other process elements in very considerable numbers. Rough cost estimates of "model" three-channel "primary" systems and for full six-channel primary/secondary systems are shown under the "What Costs Can Be Expected?" section.

It is our present opinion that a comprehensive educational planning effort in formal education, even though it relies heavily upon communications technology, should not be organized within R-TT. Instead, it should be the basic means by which the Secretariat of National Education carries out its responsibilities in primary and secondary education.

Whether the new transmission and production facilities that would be

required should be placed under R-TT technical control is a matter to be resolved by GOT. So also is the question of whether the SONE should have responsibility for overseeing the improvement of the non-scholastic educational activities in other secretariats.

It would appear that experience in educational technology systems that have been developed elsewhere should establish "rules" by which matters such as jurisdiction and control could be rather easily resolved by impartial observers. Actually, experience shows the naivete of this approach. Those who recommend systems, seldom operate them. Therefore, it is essential that important questions of administration and responsibility be carefully analyzed by specialists with experience with those who will need to understand and implement the kind of educational and technical system that has been outlined in this report. These questions are not the proper subject of a preliminary study, except to identify what must be given further discussion and consideration by the qualified parties.

Engineering and Technical Considerations

A review of the information and data developed by the survey team leads to the following engineering recommendations:

1. Recognizing that the most pressing requirements for television equipment needed by the Tunisians to make more effective use of the R-TT expanded broadcasting system is the availability of additional television/radio receivers, a study should be initiated to develop a design meeting the specific needs of the Tunisians. Such a design should consider the following features:

a. Immunity against wide line-voltage fluctuations unless the voltage regulation characteristics of the power transmission and distribution system can be corrected.

b. An integral FM/AM tuner to provide television, AM radio, and FM radio reception.

c. Provisions for convenient field installation of a UHF TV tuner in the event the implementation of UHF channels become necessary to provide the necessary number of in-school TV channels.

d. A VHF tuner that could be readily adjusted in the field so that detent positions corresponding only to the TV channels serving the area are available.

e. Adequate tuning stability to permit the elimination of the fine-tuning control which is often the object of abuse and hence poor reception.

f. Encapsulated flyback transformers and picture-tube deflection yokes of plug-in construction.

g. Environmental protection of all components susceptible to dust, humidity and temperature extremes.

2. Conduct a feasibility study to determine the most practical way to provide additional TV channels for Tunisia. Some possible methods for consideration are:

a. A multi-channel UHF system backed up by a network of low-power UHF-to-VHF translators. Such a system would provide

local "spot coverage" for the more densely populated rural as well as urban areas receivable on standard VHF receivers with virtually no interference hazard to the expanded R-TT VHF system.

b. A point-to-point multi-channel microwave system. The design of such a system should be closely coordinated with the plans of R-TT now under consideration to interconnect the proposed TV broadcast stations.

c. A multi-channel 2500 mHz system.

Of the three possible methods outlined above, the multi-channel UHF system with UHF-to-VHF translators appears to be the most practical approach at this stage of the study. This is largely based on the fact that the methods outlined in (b) and (c) above are restricted to in-school instructional applications and hence cannot provide additional program channels receivable on standard television sets in homes and many community centers. The required number of additional channels for an in-school instructional function could be provided with method (a) without the UHF-to-VHF translator network. This is based on the principle that the design of an in-school TV transmission system includes the individual school receiving antenna systems and classroom distribution systems as well as the transmitters. Thus the school receiving antennas could be of the UHF type equipped with a single low-cost UHF converter so that the instructional programs could be displayed in the classrooms on standard VHF television receivers.

Clearly, accurate information on the comparative costs of implementing the three possible methods for providing additional channels throughout Tunisia is desirable as early in the study phase as possible. Unfortunately, this cannot be done until a preliminary design for each method under consideration is completed. Such designs must take into account the nature of the terrain which blocks the transmission of television signals, the availability of access roads and electric power service to optimum sites, as well as building construction costs, transportation and installation of equipment. Clearly such preliminary designs necessary for reliable cost estimates could not be developed during the team's brief visit to Tunisia. In this respect, it is reasonable to assume that the completion of the existing R-TT expansion program could provide useful cost data with regard to equipment building construction costs and equipment installation costs in Tunisia. Further, it would be highly desirable to make a decision on any further expansion plans early enough to coordinate the equipment building space requirements with R-TT to avoid costly duplication of buildings and antenna supporting towers.

3. Conduct a study to establish the minimum number of television receivers and optimum locations necessary to make available to as many Tunisians as possible - particularly in the rural areas - the benefits of the extensive television and radio broadcast system now under construction by Radiodiffusion-Television Tunisienne.
4. In the event a significant number of television/radio receiving systems are installed throughout rural Tunisia, it is most

important that this program be coupled with effective maintenance facilities! The geographical area of Tunisia is such that a number of maintenance stations would be desirable to minimize the distances over which defective receivers would have to be transported. In any event, the television receivers should not be repaired on the operating site. At least 10 per cent spares should be provided so that a defective receiver can be immediately replaced with a serviceable receiver so that the defective receiver may be properly serviced at a nearby station where trained maintenance personnel, adequate test equipment and spare parts are available. Again, the expense of establishing such maintenance stations cannot be established until it is known how many TV/FM/AM receivers are involved and how they are distributed geographically.

5. Develop technical training programs in Tunisia using the operational television and radio facilities as an advanced "intern" laboratory.

What Costs Can Be Expected?

The absence of a specific set of plans precludes the presentation of projected costs in any complete detail. It is possible, however, to indicate a range of costs for several levels of technological operation.

The low end of the scale described here assumes "critical mass" operation of an educational planning and design function for various non-scholastic programs, use of the R-TT one-channel network, dedication of many existing resources at R-TT and elsewhere in GOT, and limited numbers of receiver installations. The other figures in the scale assume comprehensively functioning methodological design efforts within the Secretariat of National Education, receiver installations in schools, plus more elaborate television transmission facilities throughout the country.

Specific costs for "outside" educational personnel, school construction, distribution systems for printed materials to support instructional programs, and extension of adequate power facilities have not been itemized in these calculations. At this stage of discussion, such projections would be more misleading than helpful.

The dollar figures expressed in the following tables are roughly based on Tunisian costs.

LEVEL 1

Non-scholastic Programs Only

(8 station system)

A. Minimum educational planning unit to be housed, physically and administratively, within R-TT.

B. Program distribution to be made through R-TT single-channel television network of 8 transmitters for nationwide coverage.

Capital Expense	
Central Office and Technical Facilities (Minimal "remodeling" of R-TT facilities)	$ 500,000
Television Receivers (10,000) (Sets plus Installation)	3,000,000
Total Capital Expense	$3,500,000
Operating Expense (Annual)	
(Including Required Additional Personnel)	$ 250,000/Yr.

This gives a ten-year cost of $6,000,000 or a Cost Index of $0.60 per year/per one million auditors. The number of auditors actually involved may be greater than this number, thus lowering unit cost.

N. B. A Cost Index is derived from the following formula:

$$CI = \frac{\text{Capitalization} + 10 \times \text{Operating Expense}}{1{,}000{,}000 \text{ Auditors}} \div 10 \text{ years}$$

LEVEL 2

Primary Schools - Comprehensive*/

(24 station system)**/

A. Educational planning unit to be housed, physically and administratively, within SONE.

B. Program distribution to be made through R-TT single-channel television network plus additional network of two-channels-per-area for nationwide coverage. (8 existing plus 16 additional transmitters.)

Capital Expense	
Central Office & Technical Facilities (Construction and Acquisition)	$ 1,200,000
Transmission System (Construction and Acquisition)	4,800,000
Television Receivers (20,000) (Sets plus Installation)	6,000,000
Capital Expense Total	$12,000,000
Operating Expense (Annual)	
(Including Required Additional Personnel)	$ 750,000/Yr.

This gives a ten-year cost of $19,500,000 or a Cost Index of $1.95 per year/one million auditors. The number of auditors actually involved may be greater than this number, thus lowering unit cost.

---

*/ Perhaps also involving certain non-scholastic projects.

**/ Computation based on there being 8 television coverage zones in the country.

LEVEL 3

Primary Schools - Comprehensive*/

(24 station system)**/

A. Educational planning unit to be housed, physically and administratively, within SONE.

B. Program distribution to be made through new television network of three-channels-per-area, for nationwide coverage.. (24 new transmitters.)

Capital Expense	
Central Office & Technical Facilities (Construction and Acquisition)	$ 1,200,000
Transmission System (Construction and Acquisition)	7,200,000
Television Receivers (20,000) (Sets plus Installation)	6,000,000
Total Capital Expense	$14,400,000
Operating Expense (Annual)	
(Including Required Additional Personnel)	$ 800,000/Yr.

This gives a ten-year cost of $22,400,000 or a Cost Index of $2.24 per year/one million auditors. The number of auditors actually involved may be greater than this number, thus lowering unit cost.

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*/ Perhaps also involving certain non-scholastic projects.

**/ Computation based on there being 8 television coverage zones in the country.

LEVEL 4

Primary and Secondary Schools - Comprehensive*/

(48 station system)**/

A. Educational planning unit to be housed, physically and administratively, within SONE.

B. Program distribution to be made through R-TT single-channel television network plus additional network of five-channels-per-area for nationwide coverage. (8 existing plus 40 additional transmitters.)

Capital Expense	
Central Office & Technical Facilities (Construction and Acquisition)	$ 2,000,000
Transmission System (Construction and Acquisition)	12,000,000
Television Receivers (25,000) (Sets plus Installation)	7,500,000
Total Capital Expense	$21,500,000
Operating Expense (Annual)	
(Including Required Additional Personnel)	$ 1,200,000/Yr.

This gives a ten-year cost of $33,500,000 or a Cost Index of $3.35 per year/one million auditors. The number of auditors actually involved may be greater than this number, thus lowering unit cost.

---

*/ Perhaps also involving certain non-scholastic projects.

**/ Computation based on there being 8 television coverage zones in the country.

LEVEL 5

Primary and Secondary Schools - Comprehensive */

(48 station system) **/

A. Educational planning unit to be housed, physically and administratively, within SONE.

B. Program distribution to be made through new television network of six-channels-per-area for nationwide coverage. (48 new transmitters.)

Capital Expense	
Central Office & Technical Facilities (Construction and Acquisition)	$ 2,000,000
Transmission System (Construction and Acquisition)	14,400,000
Television Receivers (25,000) (Sets plus Installation)	7,500,000
Total Capital Expense	$23,900,000
Operating Expense	
(Including Required Additional Personnel)	$ 1,300,000/Yr.

This gives a ten-year cost of $36,900,000 or a Cost Index of $3.69 per year/one million auditors. The number of auditors actually involved may be greater than this number, thus lowering unit cost.

---

*/ Perhaps also involving certain non-scholastic projects.

**/ Computation based on there being 8 television coverage zones in the country.

Further studies should provide substantial detail on costs, including the projected savings of the technologically-facilitated system over the traditional system; the unit cost per student for capital and operating expenses; and the anticipated capacity of the system to accommodate larger numbers of students without commensurate increases in costs of providing the basic instructional program.

In further consideration of the costs of media systems, it will be helpful to be reminded of the observations recently reported by the International Institute for Educational Planning:

> "Do the new educational media save money? We pointed out that this is a very complex question, requiring one to measure quantitative cost against some things not so easily quantified--the quality of education, for example. Media projects will rarely save over present budgets, but often make possible a substantial saving in the context of growth and change--when a school system is planning to change a curriculum, offer new and different subjects, extend its services to persons or places where education has not before been available, or bring more people into the company of literate and educated persons. Even here, however, the saving is usually against possible or projected costs rather than present costs. Very often the media make it possible for a school system to do what it could not otherwise have done, regardless of cost; or to do faster what could otherwise have taken longer. And regardless of the quality of the evidence that they have saved financial resources, there is no doubt that they have contributed to the saving of human resources."*/

*/ The New Media: Memo to Educational Planners, p. 153. UNESCO: IIEP, 1967.

RECOMMENDED NEXT STEPS

We believe the manifest needs of Tunisian education are such that a rational application of telecommunications to improve the processes of educational methodology could have tremendously beneficial effects. With this capability, national programs of education could become more systematic, effective, efficient - and thus more economical. In short a more favorable balance between the inputs and outputs of various educational efforts could be realized.

However, we recognize that further study and consultation with Tunisian authorities is needed before a specific and detailed operational plan for educational development can be established. Therefore, we earnestly recommend that a special high-level Task Force be convened to help the executive sector of GOT examine the potentials of technology and plan out a detailed program of development.

We suggest that a Task Force (composed of an educational technologist, an electronics engineer, a curriculum specialist and an economist) have these activities programmed over about a six-month period. About half of the time would involve work in Tunisia itself, with the remainder given to drawing up detailed plans.

We urge that the selection of a well-integrated Task Force be assigned a professional organization with experience in this kind of educational planning. In our opinion, such an institutionalizing arrangement would be more productive than choosing the Task Force members independently, without regard for important complementary strengths.

We urge that the Task Force be given full authority to help the Tunisians

develop a detailed plan for using telecommunications to facilitate improvement of educational methodology, limited only by their not being able to commit the United States Government to provide any support for such a plan. We believe that the most effective role for AID at this stage would be to underwrite this Task Force planning effort, which would have a number of sequential steps:

1) The articulation to the Tunisians of the potentials of using television technology systematically to facilitate new approaches for dealing more efficiently with a wide spectrum of educational tasks and problems;

2) The analysis of all the various administrative commitments requisite to effect improvements in education and educational planning, with particular reference to the organizational placement of this responsibility within SONE or elsewhere in the GOT structure;

3) The specific determination of the facilities, materials and personnel which would be needed, with special concern given to the possible re-dedication of certain existing resources;

4) The preparation of specific plans for educational development to base future courses of commitment and action by both the U. S. and GOT, separately and in concert. The plans should allow for a detailed scrutiny of all capital and operating costs, and cost projections.

We estimate that the Task Force activity might cost something in the neighborhood of $65,000 to $75,000, including staffing, travel and report production.

PART A

EXISTING TELEVISION FACILITIES OF RADIODIFFUSION-TELEVISION TUNISIENNE

STUDIO FACILITIES

Radiodiffusion-Televisions Tunisienne, usually referred to as R-TT, operates both radio and television studios in central Tunis. The television production facilities of R-TT consist of three studios and two mobile trucks suitable for remote television pickups. The three television production studios located at R-TT headquarters are the following approximate sizes:

The news studio:	10 feet x 15 feet
The utility studio:	20 feet x 30 feet
The theatre studio:	40 feet x 50 feet

The theatre studio includes an additional seating area approximately equal to the stage area. A total of eleven cameras are available as follows:

Location	Number	Type
Mobile Unit #1	2	4-1/2" Image Orthicons
Mobile Unit #2	2	4-1/2" Image Orthicons
News Studio	1	1" Vidicon
Utility Studio	3	3" Image Orthicons
Theatre Studio	3	4-1/2" Image Orthicons

The studio and remote mobile cameras are manufactured by Thomson-Houston of Paris, France, and Marconi of Great Britain.

The master control facility, in addition to the usual switching equipment, synchronizing generators, and other supporting video/audio equipment, consists of a telecine center and a video tape recording/reproducing center. The telecine equipment consists of four film chains. Each of the three film chains is equipped

with an optical multiplexer and two 16 mm TV motion picture projectors. The fourth film chain is provided with two 35 mm (2" x 2") slide projectors and a 180° rotating precision swivel base under the film camera to permit pickup from either slide projector.

The video tape recording and reproducing equipment consists of three AMPEX VR-1200 units equipped with intersync modules and electronic editing. Two of the units are installed in the R-TT studios in Tunis and one unit is installed in one of the mobile trucks. All three machines operate on 15" per second tape speed and are equipped with headwheel panels operating on 10 mil gap-width standards. Average headwheel head life using 3M #379 video tape is approximately 400 hours. Headwheel "turn-around-time" during rebuilding is a problem as it seems to be everywhere with both brands of quadruplex tape machines. Space has been provided for two additional AMPEX VR-1200 video tape recorder/reproducers which are on order and awaiting delivery.

The R-TT studio also includes a photographic darkroom, an automatic 16 mm movie film processor, and magnetic stripe dubbing (synchronization) facilities.

The R-TT studio equipment is predominantly of French manufacture with the exception of the five Marconi cameras manufactured in Great Britain and the two AMPEX video tape recorder/reproducers manufactured in the United States.

The "in-studio" production time appears to be rather large for the number of "on-air" hours of programming produced. It was learned that approximately 21 hours of on-air program time produced in Tunis "requires" the use of all three

production studios (although not simultaneously) approximately eight hours each day. Further discussion of this point revealed that the production staff has no reliable statistics on the "production time/on-air" ratio.

BROADCASTING FACILITIES

The existing Tunisian broadcasting facilities consist of a principal transmitting plant located on the top of Mount Zaghouan approximately 60 km south of Tunis. Television programs are relayed to the principal transmitting plant over a 7 gigahertz microwave studio-to-transmitter link of French manufacture. Two-way radio facilities are also available to provide communications between the studios in Tunis and the Zaghouan transmitter installation.

A relatively low-power satellite rebroadcast transmitter is operated on the top of Mount Boukournine approximately 16 km southeast of Tunis to provide a uniformly strong television signal over the populous Tunis area. This rebroadcast station is programmed using an "off-the-air" relay technique from the principal transmitter located on Mount Zaghouan.

Mount Boukournine is also the site of an automatic relay transmitter which rebroadcasts programs originating from an Italian station operating on Channel 6 and located in Pantelleria. This relay transmitter was installed by the Italians for the 1960 Olympic games. After the Olympic games, the Italians donated the facility to the Tunisian government. The facility is now operated and maintained by the Tunisians. However, the Italian donors provide the spare parts necessary for maintenance at no cost.

The Tunisian television system makes use of both vertical as well as

horizontal polarization of the radiated signals in order to minimize the co-channel and adjacent channel interference between the future and existing stations within the Tunisian system as well as stations operating in adjacent countries.

The principal transmitter on Mount Zaghouan operates on Channel 11 (Tunisian Standards) with horizontal polarization using a 10 kilowatt transmitter manufactured by T. R. T. of Paris, France.*/ The antenna system consists of three arrays supported on a 107 meter (350 foot) self-supporting tower at an elevation above mean sea level of 1200 meters. The antenna system establishes three major radiation lobes to provide the following Effective Radiated Powers (ERP) towards the following communities:

ERP	Community
280 kw	Sfax
180 kw	Beja
100 kw	Tunis

The major elements of the principal transmitting facility at Mount Zaghouan are shown in Figure 1.

The Boukournine relay transmitter southeast of Tunis operates on Channel 7 (Tunisian Standards) using a 500 watt (0. 5 kw) transmitter of French manufacture to provide an Effective Radiated Power of 5 kw towards Tunis. The Italian relay transmitter serving Tunis operates on Tunisian Channel 5. Figure 2 summarizes the existing R-TT television broadcast system.

The transmitter building on the summit of Mount Zaghouan is of special interest in that it is an unusually rugged structure constructed of steel

*/ Telecommunications Radioelectriques et Telephoniques.

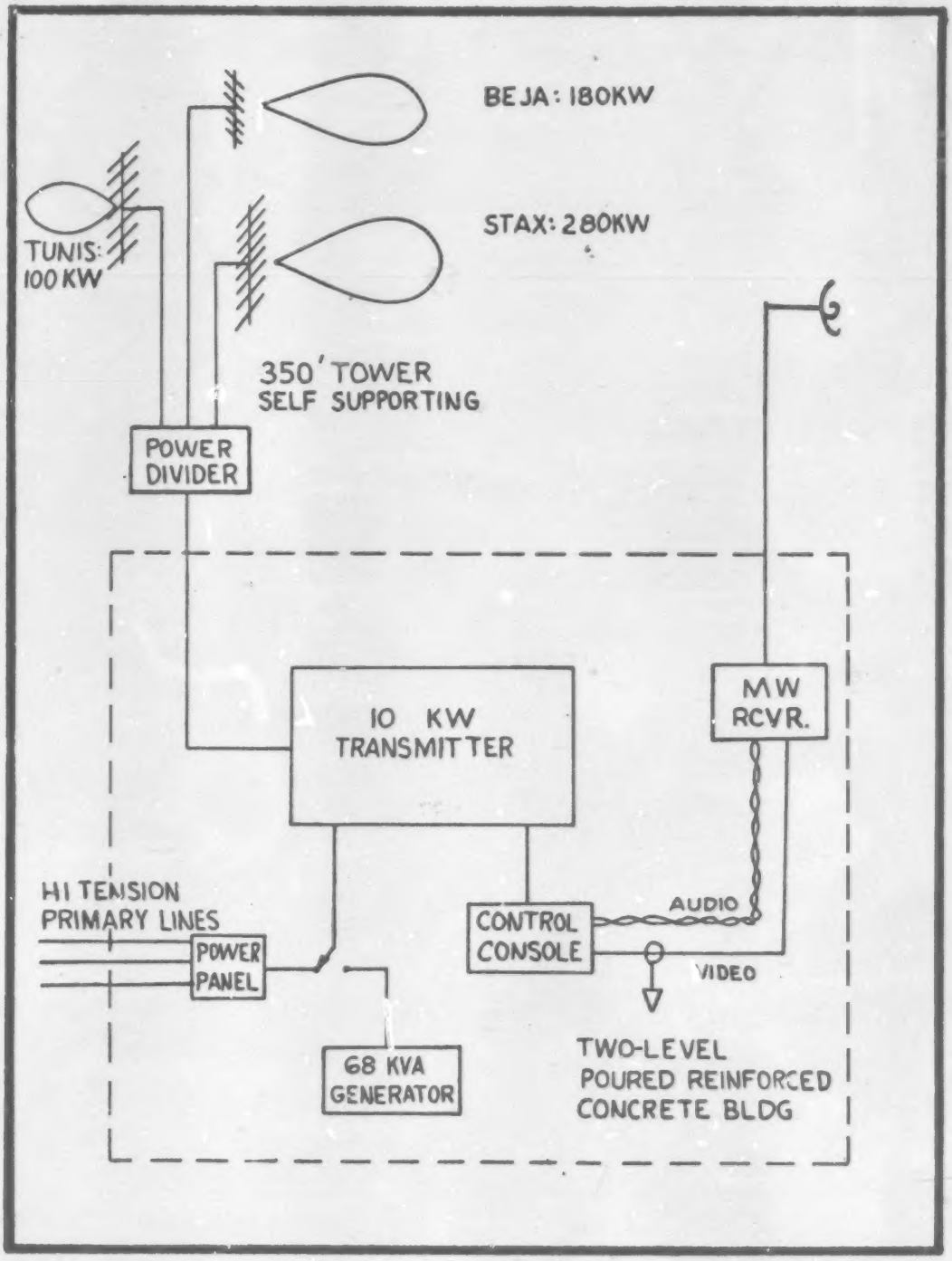

FIGURE I BLOCK DIAGRAM OF ZAGHOUAN CHJ1 TRANSMITTER FACILITIES.

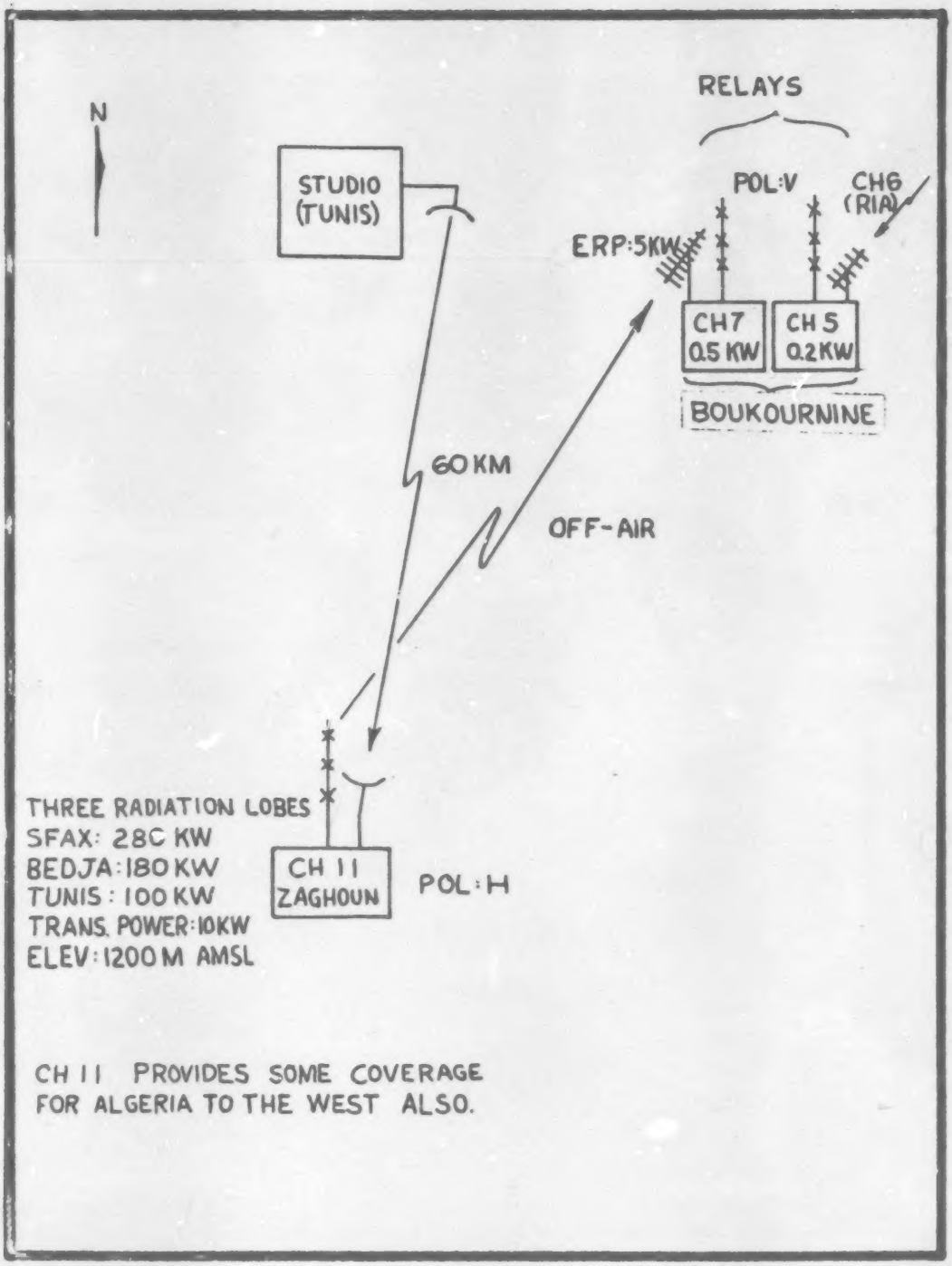

FIGURE 2 EXISTING R.T.T. TV BROADCAST SYSTEM

reinforced poured concrete and appears to be much larger than needed to accommodate the equipment currently in operation. The operating personnel, consisting of one supervisor and two operators, stated that future plans for additional equipment include only one 3-kw FM transmitter and a 1-kw emergency TV transmitter. It is estimated that the two-level structure exhibited adequate space to accomodate ten times the equipment planned without undue crowding. The construction cost of this building was reported to be 300,000 Dinars (approximately $600,000) by the transmitting plant supervisor and 200,000 Dinars ($400,000) by Hassan Akrout, Chef de Service for Television for R-TT.

TUNISIAN TELEVISION OPERATING STANDARDS AND CHANNEL FREQUENCIES

The Tunisian television operating line and frame rate standards are the French standards of 25 frames per second (50 fields per second) and 819 horizontal lines. However, the channel width and frequency assignment plan is based on the western European standards of 7 mHz instead of 14 mHz as in France. Figure 3 is a summary of the television allocation plan for Tunisia. It should be noted that the assignment of Channel 10 is in doubt at this time in that it may ultimately be assigned to Algeria.

An interesting sidelight on the matter of operating standards is the fact that the Italian relay station operating in Tunisia on Channel 5 employs a scan converter to change the Italian transmissions, which are on the CCIR scanning standards (25 frames and 625 horizontal lines), to the Western European standards employed in Tunisia.

Channel No.	Visual Frequency		Aural Frequency
2	48.25	-	53.75 mHz
3	55.25	-	60.75 mHz
4	62.25	-	67.75 mHz
Mobile Radio and Aero. Nav.	67.8	-	87.5 mHz
FM Radio	87.5	-	100 mHz
Land Mobile	100	-	108 mHz
Aeronautical	108	-	144 mHz
Amateur Radio	144	-	146 mHz
Marine	146	-	157 mHz
Unassigned	157	-	174 mHz
5	175.25	-	180.75 mHz
6	182.25	-	187.75 mHz
7	189.25	-	194.75 mHz
8	196.25	-	201.75 mHz
9	203.25	-	208.75 mHz
10 */	210.25	-	215.75 mHz
11	217.25	-	222.75 mHz

*/ In doubt at this time, may be assigned to Algeria.

FIGURE 3: CHANNEL AND FREQUENCY ASSIGNMENT PLAN FOR TUNISIA.

R-TT RADIO BROADCASTING FACILITIES

The radio broadcasting facilities of R-TT consist of one short wave and two medium wave broadcast stations. The medium wave stations operate in the frequency range normally referred to as the AM "broadcast band" in the United States which extends from 535 to 1605 kHz. The short wave transmitter broadcasts in Arabic. One of the medium wave transmitters also broadcasts in Arabic and the remaining transmitter broadcasts in French and Italian.

All three transmitting plants are located at Djedeida approximating 25 km north of Tunis and are programmed from the R-TT studios in Tunis over telephone lines. Figure 4 summarizes the operating power and frequency of the three AM radio stations. It is interesting to note that the medium wave station which is programmed in Arabic on a frequency of 610 kHz is of high power. This transmitting facility is provided with two 300 kilowatt transmitters which are operated in parallel during the evening hours to deliver a total operating power of 600 kilowatts.

During the early phase of the Tunisian study, some confusion was encountered regarding the existence of an FM broadcasting facility in Tunis. This confusion was finally resolved when it was learned that a low-power FM transmitter had been installed near Tunis at one time on an experimental basis to obtain data on FM coverage. This transmitter is no longer in operation. However, R-TT has plans for installing a 3 kilowatt FM broadcast transmitter at the Mount Zaghouan location to provide wide-area FM coverage.

TECHNICAL PERSONNEL DATA

The technical operating and maintenance personnel at the R-TT studios in

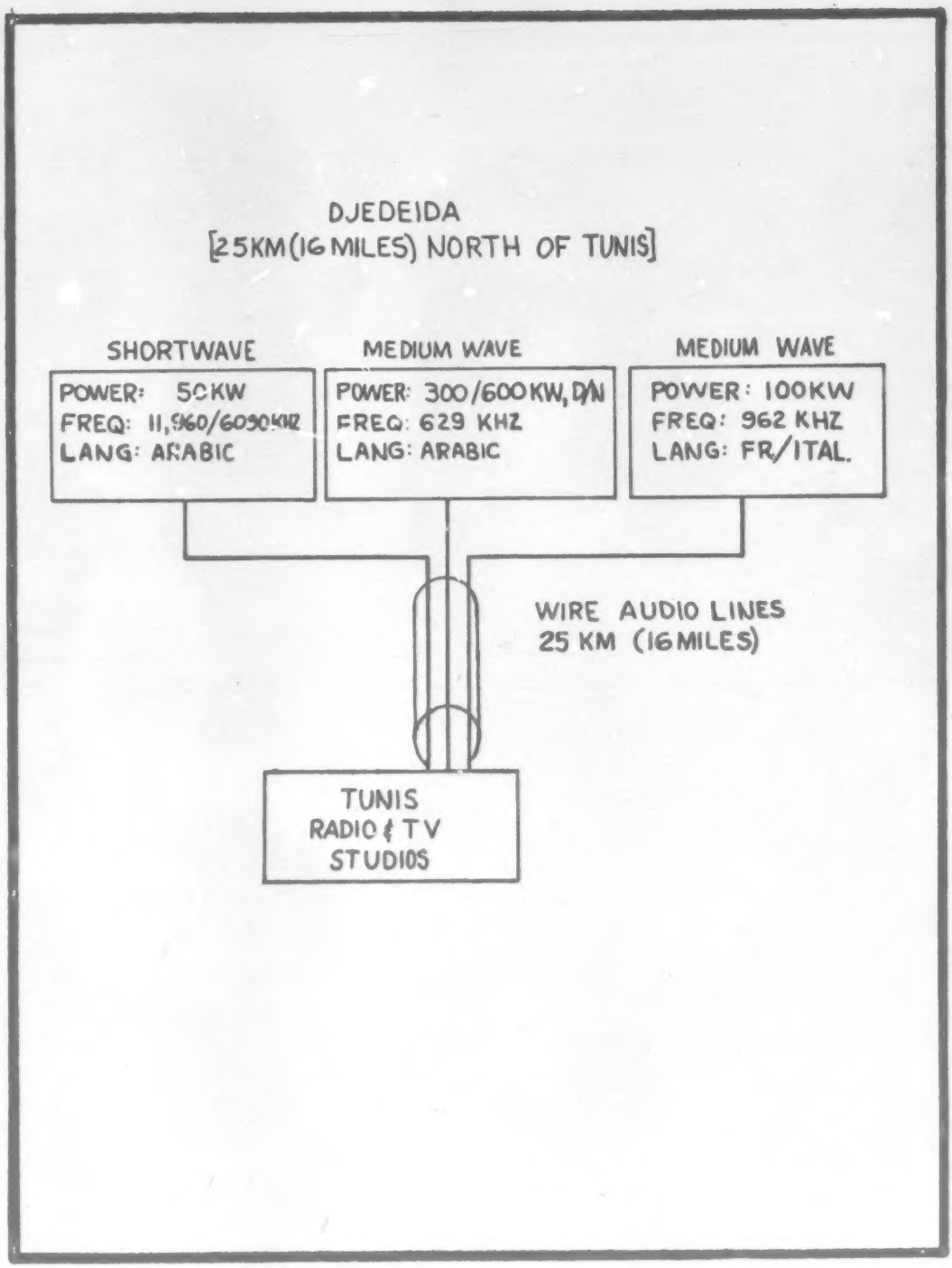

FIGURE 4 : EXISTING R.T.T. RADIO BROADCASTING FACILITIES

Tunis consists of three graduate engineers and approximately ten operation and maintenance technicians.

The three engineers are graduates from the Paris Telecommunications School which requires a university degree as a prerequisite.

The ten operating and maintenance technicians on the present staff are high school graduates who have been sent to French technical schools on a three-year scholarship in return for an agreement to stay with R-TT for a period of ten years.

The salary schedules for the graduate engineers and technicians are as follows:

Title	Annual Salary
One Principal Engineer	1560 Dinars (approx. $3100)
Two Chief Engineers	1800 Dinars (approx. $3600)
Ten Technicians	1000 Dinars (approx. $2000)

NOTE: Bonuses for technicians range from 100 to 300 Dinars/year.

PART B

PROPOSED PLANS
FOR
EXPANDING TELEVISION BROADCAST SERVICE
THROUGHOUT TUNISIA

Radiodiffusion-Television Tunisienne has recently completed plans for expanding television broadcast service throughout Tunisia and is in the process of completing plans to move the television production facilities from the present R-TT Headquarters in Tunis to new quarters near the Tunis Hilton.

PROPOSED STUDIO FACILITIES

R-TT plans to build a new television studio and office building on a site near the Tunis Hilton Hotel in order to provide additional space for television production and to provide growth space for radio production at the existing headquarters in Tunis. Work on the architectural drawings for the new complex is expected to begin during midsummer 1968. The new studio building is expected to provide space for five new television studios. Three of these studios are expected to be relatively large with two smaller studios to be used for news/weather/interview type of productions. Since the planning for the new studio building is still in the formative stage, very little additional information is available at this time.

PROPOSED BROADCAST EXPANSION

During the next two years, R-TT plans to expand the coverage of the broadcast system to all Tunisia by adding six additional transmitting plants to be interconnected by a microwave system to form a nationwide network. The following relay transmitters are expected to be in operation by December 15, 1969:

Location	Proposed Channel	Polarization
Sfax	Channel 8	Horizontal
Aln Draham	Channel 7	Horizontal
Bedja/Gorm	Channel 9	Horizontal

The following relay transmitters are expected to be in operation by December of 1969:

Location	Proposed Channel	Polarization
Kasserine	Channel 6	Horizontal
Gafsa	Channel 9	Vertical
Tozeur	Channel 5	Horizontal

R-TT proposes to use 10 kilowatt television transmitters manufactured by TRT*/ of France which are identical to the transmitter now in use at the principal transmitting plant on Mount Zaghouan. It is also understood that the transmitter buildings for the six additional transmitting facilities will be exact replicas of the two-level steel reinforced poured concrete building constructed on Mount Zaghouan. The expanded nationwide broadcasting system is, of course, a single channel system as is the existing system consisting of two transmitting plants at Mount Zaghouan and Mount Boukournine, respectively.

Figure 5 is a functional block diagram showing the system configuration as it is expected to be by December 1969. It is observed that although all of the proposed transmitters are interconnected with microwave relay links, the Tunis relay station operating on Channel 7 will continue to be programmed from Channel 11 on Mount Zaghouan using the direct off-air technique.

*/ Telecommunications Radioelectriques Et Telephoniques, Paris, France.

INTERCONNECTION WITH EUROPEAN NETWORK

The upper right hand corner of Figure 5 shows a proposed microwave link between Italy and the Boukournine off-air rebroadcast transmitter which serves Tunis. The purpose of this link is to provide a European program feed into the Tunisian System via Italy. The Ain Draham relay transmitter when completed will also serve to provide a link between the television system of Algeria and Tunisia.

It is also understood that a submarine cable system is either in the planning stage or is now undergoing installation along the bottom of the Mediterranean between France and Tunisia. Although it is highly probable that this submarine cable is intended only to provide telegraph and telephone communications facilities, the NAEB Team continued to pick up persistent reports that this submarine cable would also be capable of providing a direct television interconnection between France and Tunisia. These reports or rumors should be investigated further.

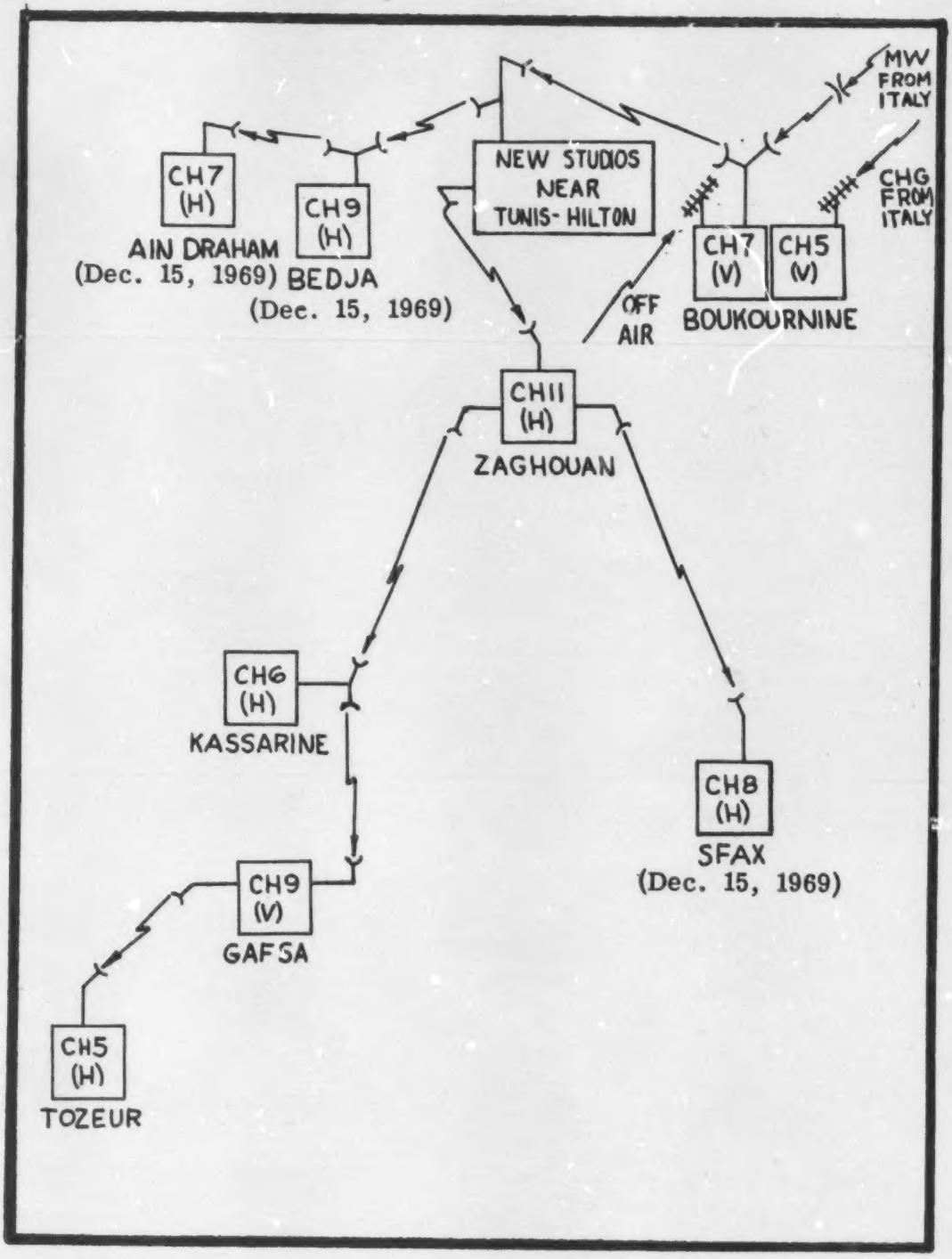

FIGURE 5: PROPOSED R.T.T. TV BROADCAST SYSTEM-1969

PART C

THE TELEVISION RECEIVERS

It has been reported to the Survey Team that there is a total of approximately 35,000 television receivers in Tunisia which has a population of approximately 4.5 million people. The following brands of TV receivers represent a large fraction of the receivers available in Tunis:

Name	Manufacture
Autovox	Italy
Telefunken	Germany
Phillips	Netherlands
Carthage	(Assembled in Tunis with French parts)

Undoubtedly, British, Japanese and Eastern European television receivers are also available in Tunisia although none were observed by the Survey Team.

Most of the television receivers in Tunisia are of the table model variety with a 59 cm screen (23 inches) and virtually all receivers utilize outside antennas.

Almost all of the TV receivers in Tunisia are equipped with an "outboard" voltage regulating transformer as an accessory item.

A voltage-regulating transformer appears to be essential to "iron out" the fluctuations in line voltage which would otherwise cause wide variations in picture size, tearing and rolling of the picture caused by partial loss of synchronization. The need for such a transformer constitutes an indictment of the power generation and distribution system in Tunisia rather than the television receivers in general use.

The cost of a typical receiver - including the necessary accessory items -

from any one of the television retail stores in Tunis (the government regulates the price of TV sets and other devices) is tabulated as follows:

Television Receiver Brand:	Carthage	
Type and size:	Table model with 23" screen	
Receiver	86 dinars	$172.00
Voltage regulator:	7 dinars	14.00
Outside antenna:	2 dinars	4.00
Transmission line:	2 dinars	4.00
Misc. connectors, etc.	1 dinar	2.00
Total	98 dinars	$186.00

Installation of these receivers for school reception involving several classrooms might be expected to add a cost of about $100 per unit.

TELEVISION RECEIVER MAINTENANCE FACILITIES

The availability of effective TV receiving maintenance facilities in Tunis - and in all probability throughout Tunisia - appears to be somewhat spotty. This judgment is based on discussions with a number of individuals interviewed and the observation of the performance of a small number of television receivers in the Tunis area.

PART D

ELECTRIC POWER GENERATION AND DISTRIBUTION FACILITIES

Considerable information on the existing electric power generation and distribution facilities was obtained from Mr. W. A. Stiles, Chief, Engineering Division of Public Works for A. I. D. in Tunisia. The main generation facility is an oil-fired steam plant located in La Goulette, east of Tunis, near the mouth of Tunis Bay. The capacity of the main plant is 50×10^6 watts or 50,000 kilowatts. Numerous small diesel plants are scattered throughout Tunisia with capacities ranging from 50 to 75 kilowatts to provide power in the remote areas of the Republic.

Secondary distribution service is 50 Hz 200 volts AC, with parts of Tunis served with 120 volt lines.

The Tunisian electric power distribution service appears to exhibit the following characteristics:

Frequency:	50 Hz	
Frequency fluctuations:	$\pm$2 Hz	
Voltage fluctuations:	Extreme variations:	87-153 volts
(Typical 120-volt service)	Typical variations:	95-135 volts

The voltage fluctuations quoted above are regarded as rather severe - particularly when related to the requirements of standard production run television receivers - and serves to explain the necessity of equipping all standard TV receivers with auxiliary voltage-regulator transformers.

Figure 6 shows the location and routing of the existing proposed electric power transmission/distribution lines throughout Tunisia. It is anticipated that power transmission and distribution facilities will be available in all Tunisia by 1971.

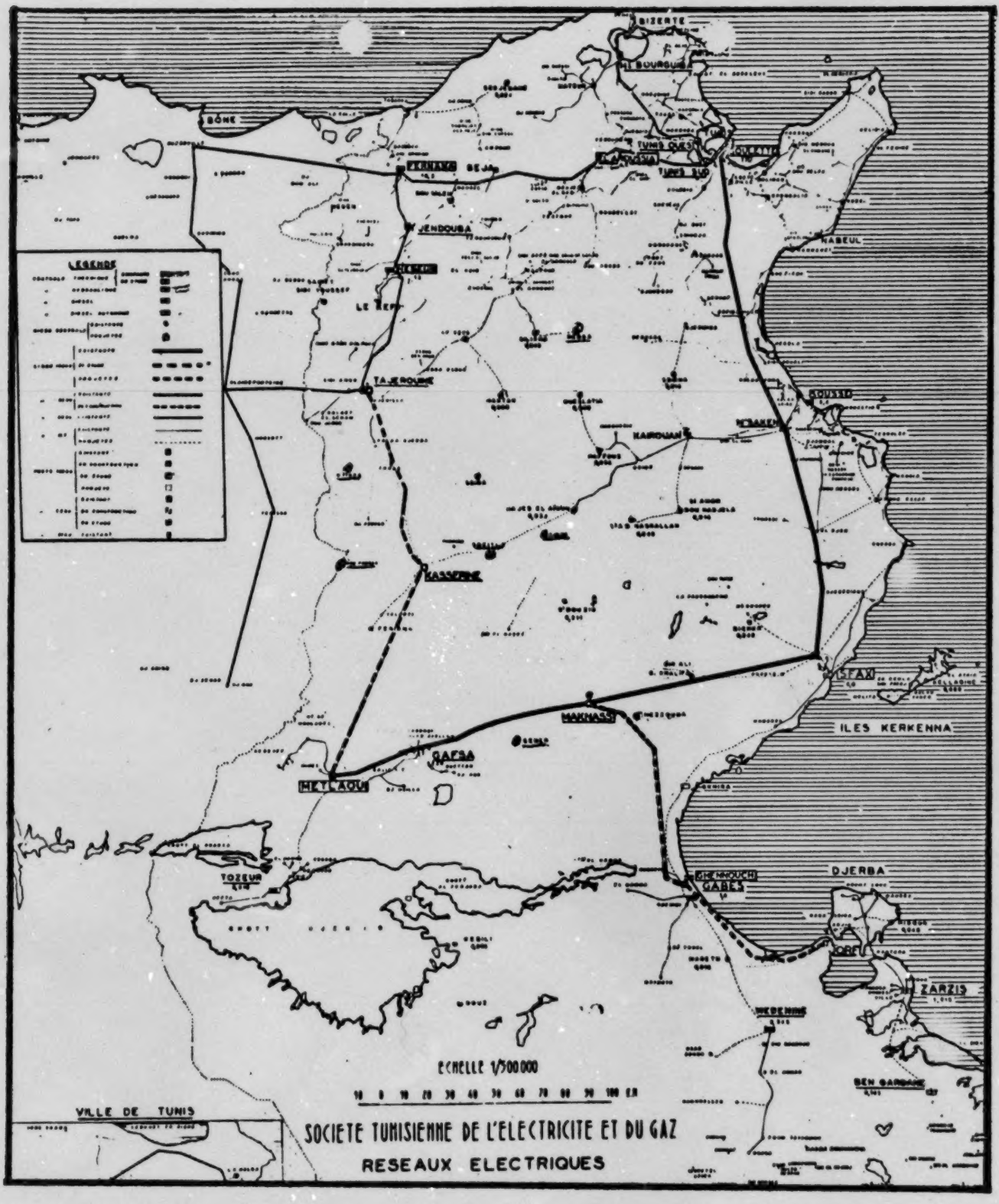

FIGURE 6. EXISTING AND PROPOSED ELECTRIC POWER TRANSMISSION AND DISTRIBUTION SYSTEM.

PART E

MINIMUM ELEMENTS FOR NEW INSTRUCTIONAL DESIGN AND EDUCATIONAL PLANNING FUNCTIONS

Minimum Personnel

We estimate that a minimum educational planning effort at the extra-scholastic level would probably require adequately trained personnel of the following kinds and numbers. (For a full and properly functioning operation, the studio teachers, content authorities, and other such educational specialists needed to conduct specific undertakings must be provided by the GOT units actually involved.)

1 - Director-general

Administration

1 - Section head/accountant/office manager
6 - Typist/stenographer/clerks (serving in a "pool")
1 - Janitor/porter
1 - Receptionist/typist

Planification

4 - Educational strategy specialists

Realisation (Production)

1 - Section head (chief of production)
2 - Television director/switchers
2 - Graphic artists
2 - Photographer/processors
1 - Master printer/layout specialist
1 - Editor/writer (for text materials)
9 - TV production crewmen (for cameras, audio, lighting, etc.)
1 - Carpenter/utility man
1 - Press man

Operations

1 - Section head (chief engineer)
1 - Receiver-maintenance supervisor/technician
6 - Receiver-maintenance technicians
1 - Studio supervisor/technician

Operations (cont'd)

4 - Studio operations/maintenance technicians
2 - Videotape specialist/technicians

Animation (Utilization)

2 - Animation (utilization) specialists

Evaluation

2 - Psychometrists

53 - TOTAL

Minimum Equipped-Spaces

We estimate that a minimum effort at the extra-scholastic level would require suitably equipped-spaces of the following kinds and minimal approximate sizes:

2 - Television Production Studios, each suitably equipped with 2 Image Orthicon cameras, microphones, lighting apparatus, monitors, and the like. (Each 750 sq. ft.)	1, 500 sq. ft.
2 - Studio Control Rooms, each suitably equipped with video recorder, turntable, monitors and the like. (Each 150 sq. ft.)	300 sq. ft.
1 - Master Control Complex, suitably equipped for audio-video switching/monitoring, telecine-operations, and videotape operations and storage. 3 telecine chains and 3 VTR units are assumed.	1, 500 sq. ft.
1 - Engineering Maintenance Shop, suitably equipped for routine "bench work."	150 sq. ft.
1 - Parts Storage Area for engineering supplies, suitably equipped with shelves, cabinets, spare parts.	450 sq. ft.
1 - Receiver Maintenance Shop combined with	
1 - Receiver Storage Area (for about 100 units), suitably equipped with benches, shelves, cabinets, test apparatus, spare parts and the like.	1, 000 sq. ft.
1 - Darkroom complex, suitably equipped with processing devices for handling slides, prints, and 16 mm (magna-stripe) films.	400 sq. ft.
1 - Film Editing/Storage Room, suitably equipped with benches, shelving, editors, readers, rewinds and the like.	200 sq. ft.

1 - Carpentry Shop combined with

1 - Sets/Props Storage Area and with

1 - Janitorial Supplies Closet, suitably equipped with electric and hand tools, scene docks, cleaning supplies and the like. 750 sq. ft.

1 - Graphics Production Area (Atelier), suitably equipped with drafting tables and supplies, cabinets, tracing projectors and the like. 500 sq. ft.

1 - Printing/duplicating Production Shop, suitably equipped with lithograph presses, paper cutters, collators, shelves, work-tables, and related items, plus adequate paper stock and the like. (No large-scale storage.) 1,200 sq. ft.

2 - Training/Conference/Preview Rooms, each suitably equipped with chairs, desk, blackboard, monitors, speakers, film projectors and the like. (Each 750 sq. ft.) 1,500 sq. ft.

4 - Offices (for Director-general and 3 Section Heads), each suitably equipped with desk, chairs, tables and the like. (Each 150 sq. ft.) 600 sq. ft.

1 - General Workshop Space half partitioned into

15 - Office-cubicles (for educational strategy planners, animation specialists, psychometrists, TV director/switchers, text writer plus "spares" for studio teachers, etc.), each suitably equipped with desk, chairs, shelves and filing cabinets. (Each 80 sq. ft. plus allowance for aisles and library shelves.) 1,500 sq. ft.

1 - General Work Space for

6 - Secretarial Stations, each suitably equipped with desk, chair, typewriter and other business items. (Each station 80 sq. ft. plus allowance for aisles.) 750 sq. ft.

1 - Reception Area (Lobby), suitably equipped with chairs, tables, lamps, desk, telephone console and the like.	400 sq. ft.
TOTAL SPACE (exclusive of passage-ways, hallways, restrooms, etc.)	12,700 sq. ft.

It is important we note here that the equipped-spaces enumerated and identified above should have certain functional-physical relationships to each other. This is a matter for treatment in a more detailed study.

A second caveat must be added to point up the fact that the size estimates are to be regarded as minimums for the personnel and work loads specified. The figures do not reflect any consideration of possible growth or expansion, although this question would certainly have to be analyzed in further studies.

PART F

GENERAL ITINERARY
AND
SCHEDULE OF INTERVIEWS

January 24-26, 1968, Washington, D. C.

Prior to leaving for Tunisia, the NAEB study team met with AID officials and with Dr. David Kinsey, Harvard University, the Field Director 1965-66 of the Harvard study of educational and social development in Tunisia.

January 27-28, 1968, Paris.

The Team held a background conference with Mr. Philip Coombs, Director of the International Institute of Educational Planning (UNESCO), and several members of his staff.

January 28 - February 10, 1968, Tunisia.

The group held orientation interviews with:

Mr. Stuart Baron, Chief of AID Mission, Tunisia, and various specialists on his staff, including Dr. Harold Freeman, Education Officer.

Mr. Francis H. Russell, United States Ambassador to Tunisia and several members of his staff.

Mr. Thomas Macy, Director of the Peace Corps in Tunisia.

Dr. John Simmons, current Field Director of Harvard Tunisian Project.

The group held major fact-finding interviews with:

The Chef de Cabinet, Secretariat for Youth, Sports and Social Affairs.

The Chef de Cabinet, Secretariat for Cultural Affairs and Information.

The Chef de Cabinet, Secretariat for National Education.

The Assistant to the Director of Radiodiffusion-Television Tunisienne, his associate, head of the television section and various members of the R-TT staff.

The Director of the Office of Social Education, and various members of his staff especially concerned with the operation of the national literacy project.

The Director of the new Division of Educational Planning and Research (SONE) and members of his staff.

Staff members of the Audiovisual Center (SONE) and of SATPEC, the government's film production agency.

Officials in the Agricultural Section of the Secretariat of Plan and National Economy.

Various officials in the governerates of Sousse and Kairouan concerned with the adult literacy programs.

February 10, 1968, Tunis.

On the concluding day of the field study, the head of the study team, Dr. William Odell, held a personal interview with Mr. Ben Salah, Secretary of State for Plan and National Economy.